GOVT. COLLEGE FOR WOMEN, PARADE GROUND, JAMMU-180001, J&K

(Erstwhile Maharani Mahila College)

Autonomous college affiliated to the University of Jammu

(Estd. 1944)

Response to DVV clarification for metrics ID 1.3.4

Response- 1

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College for Potential for Excellence, 2016

(Estd. 1944)

Dr. S.P Sarswat
Principal

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Tel.(O): 0191-2544303
(M): 94191-03074
Fax: 0191-2544303

DEPARTMENT OF BIOTECHNOLOGY

List of projects submitted by SEM VI students (2020)

S.No	Name	Exam roll no	Roll no	Title of the project
1	Shikha heru	6130282	311	Stem cell in regenerative medicine
2	Mineksha gotam	6136284	313	Stem cell based regenerative medicine
3	Aditi Baloria	6130287	316	Stem cell based regenerative medicine
4	Kritika Sharma	6130293	322	Stem cell based regenerative medicine
0	Shagun gupta	6130283	312	Stem cell based regenerative medicine
6	mehak sharma	6130283	317	Stem cell based regenerative medicine
7	Simran Bhat	6130294	323	Stem cell based regenerative medicine
8	Saniya Slathia	6130286	315	Stem cell based regenerative medicine
9	Aparna Kalla	6130295	324	Stem cell based regenerative medicine
10	Sanjana sharma	6130281	301	Application of cell lines as Bioreactors
11	Maria khan	6130292	321	Stem cell based regenerative medicine
12	Garima Sharma	6130289	316	Stem cell based regenerative medicine
13	Prabjot kuur	6133290	310	Stem cell in regenerative medicine
14	Haseena khan	6133291	320	Stem cell based regenerative medicine

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HOD
BIOTECHNOLOGY

Department of Computer Science, GCW Parade Ground, Jammu
Student's Project data

SESSION	NAME OF THE STUDENT	NAME OF THE PROJECT	NUMBER OF STUDENT
2016-17	Nazirua,Aditi,Nidhi,Meenakshi,Anu,Shivani,Monika	Online Hotel reservation system	7
	Monika Bhat, Khushhoo, Roha, Priyanka, Ruksar, Chetna,	e-portal for employment	6
	Isha,Sonia,Mehak,Nitalya,Shivani,Monika Kumari	Online tour and Trevel	6
	Arti,Navneet,Srishti,Ayushi,Urvashi,Akansha,	Banking Information system	6
	Kavya,Shivani,Apoorva,Anuhuti,Manpret,Shamily, Roshiba,Tania	Book management system	8
2017-18	Kajal,Gunveen,Ankita,Kamiya,Rajeswahi	online learning website	5
	Meghna,Mehak,Surbhi,Neelisha,Tanvi,Anam	online examination fee report	6
	Shefali,neha,Megha,Muskan,Hisha,Vasundra	library management system	6
	Prakriti,Simran,Mehak,Abha	Survey management system	4
	Riya Jodhyal,Sonalika,Usha,Vanshika,Divya	online shopping	5
	Anchal,Divya Pandit,Sonia,Vanshika Kapoor	online hotel reservation	4
2018-19	*Anjali,Arushi,Romita,Sapna,Sheetal*	J&K Tourism	5
	Priyanka,Priya,Palvi,Sagrika,Sohany	Feedback management system	6
	Gargi,Pooja,Harjeet,Supriya,Simran	Online shopping management system	5
	Twinkle,Parul,Rashat,sakshi,Parmeet	Hotel Management System	5
	Poonam,Tanya,Sheetal Kumari,Megha,Shweta	Class student management system	5
	Bhumika.,Kritika,Shruti,Mani	Railway reservation system	4
2019-20	Prakriti,Mehak,Meghna,Surbhi,Anam	Online admission system	5
	Falgun,Neelisha,Vanshhika,Sonalika,Nisha	e-Commerce	5
	Divya,Muskan,Usha,Shefali,Shallu	Banking Mangement system	5

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2020-21	*Ankita, Sonia, Rashika, kajal, Shriya Pandon*	Air ticket management system	5
	Sakshi, Maneesha, Simran, Stuti, Saloni	Library management system	b
	Surbhi, Shriya, Harpreet, Shakshi, Vipasna	Bus nooking online system	5
	Kajal, Ritika, Rakshita, Aditi, Monika	Online calendar	5
	Sheetal, Upasana, Prakriti Sharma, Rashika, Falgun, Shallu	Online fee payment system	6

Jamwal

(Ms. Roopali Jamwal)
Head, Computer Science

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Govt. College for Women, Parade Ground, Jammu
P.G. Department of Zoology

Student's Project Data session 2020-21

S. No.	Name of the student	Title of the project	Number of students
1.	Himani, Namrita, Qummer	Collection of information about the fish fauna of J&K	03
2.	Aabroo, Zenab, Khalida	Collection of information about the warm water fishes	03
3.	Anisha, Sakshi, Shivali	Project on different types of fish gears in India	03
4.	Anjali, Anamika. Anuradha	Project on status of fish and fisheries in India.	03
5.	Urvashi, Minakshi, Diksha	Project on status of processing of fish in India	03
6.	Sakshi, Shamila, Navjeet	Project on locally available cat and carp fishes.	03
7.	Muskan, Asha, Shazreen	Collection of information on types of fish feed being used in India	03
8.	Vaishali, Anjali, Ridi	Project on status of fish culture in J&K	03
9.	Divya, Janees, Nancy	Collection of information on fish fauna from class Actinopterygii in J&K	03
10.	Radhika, Kiran, Anamika	Project on Indian cold water fishes	03
11.	Palvi Devi, Shalu, Tashi, Shivani, Mehak, Gurleen, Shivani, Harmanjeet, Shivani, Chahat	Visit to lentic water body of your area and study biodiversity, cultural and historical importance of that water body.	10
12.	Azra, Priya, Shivangi, Nidhi, Tanuja, Sonali, Shweta, Sakina, Preeti, Aisha	Visit to lotic water body of your area and study biodiversity, cultural and	10

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		historical importance of that water body.	
13.	Simran Goswami, Asha Sonam, Anu Sharma	Lactose intolerance (Prevention, symptoms, etiology, prophylaxis and preventive measures with respect to herbal care)	3
14.	Samriti Sharma, Lavisha Bharti, Kajal Thakur	Glutinin intolerance (Prevention, symptoms, etiology, prophylaxis and preventive measures with respect to herbal care)	3
15.	Seerat Malik, Ujala Habib	Heart block (Prevention, symptoms, etiology, prophylaxis and preventive measures with respect to herbal care)	2
16.	Sunaina Sharma, Rupam Singh	Stroke (Prevention, symptoms, etiology, prophylaxis and preventive measures with respect to herbal care)	2
17.	Shabina Akhter, Manisha Bhardwaj	Kidney stones (Prevention, symptoms, etiology, prophylaxis and preventive measures with respect to herbal care)	2
18.	Aditi Verma, Priya Sharma	Gall stones (Prevention, symptoms, etiology, prophylaxis and preventive measures with respect to herbal care)	2
19.	Kajol Rajput, Rishika Dogra	Diabetes (Prevention, symptoms, etiology, prophylaxis and preventive measures with respect to herbal care)	2
20.	Hemshe Verma, Fehmeeda Bhat	Arthiritis (Prevention, symptoms, etiology,	2

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		prophylaxis and preventive measures with respect to herbal care)	
21.	Aditi Verma, Farzana Koser	Haemophilia (Prevention, symptoms, etiology, prophylaxis and preventive measures with respect to herbal care)	2
22.	Dekshika Anand, Jigmet Palkit	Memory disorders (Prevention, symptoms, etiology, prophylaxis and preventive measures with respect to herbal care)	2
23.	Vandana Kumari, Sakshi Dutta	Doping and anabolic steroids (Prevention, symptoms, etiology, prophylaxis and preventive measures with respect to herbal care)	2
24.	Payal Kumari, Unnti Magotra	Renal failure and dialysis (Prevention, symptoms, etiology, prophylaxis and preventive measures with respect to herbal care)	2
25.	Ankita Sharma, Jyoti Sharma	Spirometer and Spirometry (Prevention, symptoms, etiology, prophylaxis and preventive measures with respect to herbal care)	2
26.	Shruti Gupta, Relevance of Pranayam in Health	Relevance of Pranayam in health (Prevention, symptoms, etiology, prophylaxis and preventive measures with respect to herbal care)	2

Dr. Anuradha Gupta
Head of the Department

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Department of Electronics

Semester-VI Session 2020-21

List of Projects submitted by the students

S. No	Name of Student	Title of Project
1	Zarina Batool	Automatic Fire Alarm System
2	Fatima Banoo	
3	Rihana Batool	
4	Zahra Batool	
5	Manvi Rajput	Rain Alarm Sensor
6	Roshni Mehra	
7	Manisha Mehra	
8	Kamani	
9	Arshi Gupta	Electronic Letter Box
10	Kashish Gupta	
11	Parvi Sharma	
12	Shreya Bamotra	
13	Anu Saini	Water Level Indicator
14	Sakshi Sharma	
15	Ankita Khajuria	
16	Monika	
17	Manisha Devi	
18	Priya Sharma	Solar Panel
19	Neha Kattal	
20	Shivani Choudhary	
21	Kashish Jamwal	
22	Renu Choudhary	
23	Tanu Dhar	Wireless Transmission Circuit
24	Fanishta Begum	
25	Sonia Sharma	
26	Muskan Verma	
27	Mansi Bhagat	Rain Alarm
28	Awantika Sharma	
29	Muskan Khajuria	
30	Sonali Bhat	
31	Heena Thakur	

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S.No.	Academic Session	Name of the Student	Semester	Class Roll No.	Name of the Project
1.	2020-21	Sidra Khatoon	B.Sc. Sem I	501	To compare the moment of inertia of different Fly-Wheels.
		Shakshi Devi		540	
		Pakshi Dogra		600	
		Sonia Sharma		661	
		Simran Dhar		676	
		Ujjwal Gupta		703	
2.	2020-21	Prachi Sharma	B.Sc. Sem. II	539	Study of variation of magnetic field of a circular coil with distance.
		Pallvi Sharma		574	
		Riya Sharma		602	
		Amisha Sharma		612	
		Priya Thakur		665	
		Bhivushi		701	
3.	2020-21	Lakshita Sharma	B.Sc. Sem. III	360	Study of the characteristics of PN- junction diode and Zener Diode.
		Sakshi Sharma		374	
		Sakshi Saini		386	
		Kashish Sharma		527	
		Prinka Devi		531	
		Mansimran Sasan		562	
4.	2020-21	Shivani Sharma	B.Sc. Sem. IV	357	Study the wavelength of sodium light by using plain diffraction grating Or Newton's ring method
		Tanno Lalotra		370	
		Aishu		381	
		Komal Manhas		392	
		Misbah Iram		403	
		Priya Rajput		547	
5.	2020-21	Shruti Gupta	B.Sc. Sem. V	364	Study of Full wave and half wave rectifier.
		Bhanu Priya		437	
		Gatha Sharma		368	
		Bandhani Sharma		424	
		Jignai Palmo		427	
		Manvi Sharma		434	
6.	2020-21	Shalini Jangral	B.Sc. Sem. VI	447	To determine the value of e/m of electron by solenoid (helical) method.
		Arshi Gupta		471	
		Komal Verma		495	
		Manisha Mahajan		502	
		Avantika		521	
		Malvi Sharma		365	

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Head of Department Physics (HOD)
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P.G DEPARTMENT OF HOME SCIENCE

Project undertaken by P.G students of Home Science (CRM&E)

(Session 2020- 2021)

S.No	Name of student	Title
1.	Manisha Slani	Changing Life Style of Women In Urban Area During Covid- 19
2.	Manesha Devi	Changing Life Style of women in Rural Area During Covid-19
3.	Saima Bashir	Changing Life Style of children During Covid-19 in Rural Area
4.	Fasia Mehmood	Changing Life Style of children During Covid-19 in Urban Area

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HOME SCIENCE

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Department of Geography

Project/Dissertation undertaken by VIth Sem Students (2021)

As per the practical syllabus the students are supposed to undertake dissertation in the final semester (VIth). The details are given below

Sno.	Title of the Project/Dissertation	Name of the students
1	Study of the Occupational structure of Jammu and Kashmir	Kashish Karlupia, Mansi Jamwal
2	Status of women literacy in the UT of Jammu and Kashmir	Faiza Manawar, Mahjabeen
3	Status of unemployment in Jammu and Kashmir	Niharika Sharma, Hameera tak
4	Gender Inequality and its challenges in Jammu and Kashmir	Sabra Mahroof, Kajal Verma
5	Analysis of Industrial sector in Jammu and Kashmir	Manisha Mahajan
6	Role of Tourism in the development of Jammu and Kashmir	Shazia Kouser, Taiyub Javed
7	Literacy rate in Jammu and Kashmir	Nancy langeh, Shriya Kohli, Monika Sharma, Gulfam Choudhary
8	Declining sex ration in Jammu and Kashmir	Vaishali, Chahat Aithamia.
9	Climate change in Jammu and Kashmir	Ruksana Bukhari
10	Urbanisation in Jammu and Kashmir	Sushmita Rajput, Sakshi Devi
11	Bio Diversity and its role in the economic development of Jammu and Kashmir	Urvashi verma, Malvika
12	Agriculture in Jammu and Kashmir	Nusrat Majeed, Reena
13	Migration of Gujjar and Bakerwal in Jammu and Kashmir	Monika Kumari

Sonam Chadgal

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Dept of Geography

Department of Chemistry

Projects assigned to the students of Semester-VI for the session 2020-21

Title of the Project*: Explosives. Properties of PETN and Cyclonite. Rocket propellants.

S.No	Roll No.	Name of the student
1	12	Diksha Thakur
2	13	Riya Samotra
3	60	Rushali Verma
4	137	Sheetal Sharma
5	160	Tannia Tania
6	179	Palvi Mahla
7	280	Ritika Bharti
8	396	Rupali Rajput
9	400	Jyoti Devi
10	403	Apurva Gupta

***Projects were assigned through online mode.**

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Department of Chemistry

Projects assigned to the students of Semester-VI for the session 2020-21

Title of the Project*: Characteristics of battery.

S.No	Roll No.	Name of the student
1	08	Manu Sharma
2	16	Meenakshi Devi
3	28	Tanika Sharma
4	56	Parul Bhau
5	64	Navjeet Kour
6	100	Munisha Sharma
7	104	Hessena Choudhary
8	116	Jyoti Khatri
9	144	Aroshi Mahajan
10	148	Masrat Sadiq Shan
11	156	Shakshi Balowria
12	164	Ayushi Talwar
13	200	Isha Sharma
14	220	Aliza Tabassum
15	274	Shivani Sarmal
16	354	Sheetal Lahgeh
17	358	Mansi Manhas
18	368	Gatha Sharma

19	372	Shilpa Devi
20	384	Muskan Saini
21	388	Manvi Sharma
22	450	Aashima Mahajan.
23	460	Priyanka Kumari
24	496	Neha Kumari
25	498	Neha Devi

*Projects were assigned through online mode.

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Department of Chemistry

Projects assigned to the students of Semester-VI for the session 2020-21

Title of the Project*: Electronic transitions in UV Spectroscopy.

S.No	Roll No.	Name of the student
1	04	Simran Dogra
2	24	Akriti Thakur
3	33	Kajal Sanwal
4	207	Zenab Bano
5	237	Nargis Banoo
6	383	Vishali Sharma
7	392	Ashita Gupta
8	456	Jaspreet Kour

***Projects were assigned through online mode.**

Title of the Project*: IR Spectra in case of: (a) Benzoyl chloride (b) Benzamide (c) Benzaldehyde (d) P-nitro aniline (e) O-hydroxy benzoic acid

S.No	Roll No.	Name of the student
1	215	Annu Devi

***Projects were assigned through online mode.**

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Department of Chemistry

Projects assigned to the students of Semester-VI for the sessinu 2020-21

Title of the Project*: Lead-Acid battery.

S.No	Roll No.	Name of the student
1	21	Prem Lata
2	53	Janees Bashir
3	69	Pooja Devi
4	73	Shaista Bashir
5	75	Komal Devi
6	96	Shruti Sharma
7	121	Anita Devi
8	143	Vanshika Sharma
9	157	Shikha Sharma
10	173	Stanzin Kunzang
11	187	Palvi Sharma
12	188	Priya Bali
13	196	Jyotsana Sharma
14	240	Arshdeep Kour
15	244	Summaira Bibi
16	278	Fazilath Kousar
17	316	Aditi Balpria
18	367	Muskan

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19	376	Nidhi Verma
20	380	Sangeeta Devi
21	386	Rozy Bhagat
22	391	Ragvi Sharma
23	404	Simply Devi
24	414	Tamana Saini
25	435	Nadia Chaudhary
26	436	Rupal Saini
27	444	Harmeet Kour
28	447	Shalini Jangral
29	451	Kiran Kumari
30	452	Tsetan Dolkar
31	455	agmeet Kour
32	469	Subhanshi Sharma

***Projects were assigned through online mode.**

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Department of Chemistry

Projects assigned to the students of Semester-VI for the session 2020-21

Title of the Project*: Chemical shift in PMR Spectroscopy.

S.No	Roll No.	Name of the student
1	124	Kajal Devi
2	355	Priyanka Saini

***Projects were assigned through online mode.**

Title of the Project*: PMR Spectroscopy, Shielding and deshielding of protons.

S.No	Roll No.	Name of the student
1	81	Pooja Kalsi
2	366	Bharti Slathia
3	412	Diskit Angmo

***Projects wero assigned through online mode.**

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/Department of Chemistry

Projects assigned to the students of Semester-VI for the session 2020-21

Title of the Project*: Fertilizers - Classification and uses. Free acidity in Ammonium Sulphate fertilizer

S.No	Roll No.	Name of the student
1	01	Sonali Verma
2	05	Priyanka
3	32	Tanvi Magotra
4	36	Kriti Singh Thakur
5	52	Priyanka Gupta
6	65	Rakshanda Sharma
7	68	Fatima Kaneez
8	92	Simran Sharma
9	132	Divya Rajput
10	151	Akriti Raina
11	184	Shameema Tahira
12	192	Sana Naz
13	198	Pallavi Bhagat
14	222	Shivani Kumari
15	239	Komal Chib
16	256	Vashnavi Sharma
17	259	Sunali Thapa
18	408	Vishali Verma

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19	409	Naina Sharma
20	411	Poonam Langeh
21	439	Padma Lhamo
22	468	Sheena Kour

***Projects were assigned through online mode.**

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Projects assigned to the students of Semester-VI for the session 2020-21

Title of the Project*: Allotropy with examples.

S.No	Roll No.	Name of the student
1	20	Khusboo Yasmin Malik
2	48	Iram Shehzadi
3	76	Sawarya Bhat
4	88	Sheetal Bhutyal
5	136	Vaishali Sharma
6	140	Manvi Manhas
7	176	Shiwani Verma
8	210	Naseem Akhter
9	228	Muskan Gupta
10	236	Anika Manhas
11	260	Manju Thakur
12	312	Shagun Gupta
13	320	Haseena Kousar
14	362	Kumari Amita
15	448	Komal Saini
16	500	Abhilasha Kundal

***Projects were assigned through online mode.**

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Projects assigned to the students of Semester-VI for the session 2020-21

Title of the Project*: Catalysis – Types of catalysts. General principles and properties.

***Projects were assigned through online mode.**

S.No	Roll No.	Name of the student
1	40	Preeti Manhas
2	42	Shahnaz Akhter
3	44	Pallivi Chib
4	78	Prakriti
5	112	Varsha Thakur
6	120	Shivani Devi
7	128	Anjali Chib
8	168	Palvi Sharma
9	203	Yogita Sahu
10	208	Vishali Langeh
11	212	Taniya
12	216	Komal Bhau
13	230	Shapali Katoch
14	232	Ishrat Fatima
15	252	Zarina Begum
16	264	Kajal Thakur
17	268	Shabana Azmi
18	356	Komal Oberio
19	424	Bandhani Sharma

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Projects assigned to the students of Semester-VI for the session 2020-21

Title of the Project*: (a) Inert pair effect.
(b) Allotropy in Carbon, Sulphur and Phosphorous.

S.No	Roll No.	Name of the student
1	49	Shivani Ganjoo
2	97	Neha Bharti
3	103	Vishali Dogra
4	109	Shikha Parkash Thakur
5	113	Vidhi Manhas
6	123	Deeksha Sharma
7	125	Sonia Sharma
8	177	Shakshi Devi
9	205	Pallvee Manhas
10	223	Maneesha Choudhary
11	255	Meenakshi Verma
12	273	Santosh Devi
13	279	Zahra Batool
14	317	Mehak Sharma
15	319	Prabjot Kour
16	321	Maria Tariq
17	324	Aparna Kalla
18	467	Pooja Devi

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19	495	Komal Verma
20	497	Amisha Gupta

***Projects were assigned through online mode.**

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Projects assigned to the students of Semester-VI for the session 2020-21

Title of the Project*: Batteries and their classification.

S.No	Roll No.	Name of the student
1	03	Madhu Sharma
2	09	Diksha Dogra
3	37	Neha Nawab
4	89	Stanzin Ningsal
5	91	Chandrika Manhas
6	99	Shruti Sharma
7	105	Tsewang Dolma
8	133	Sanjeeta Devi
9	141	Shriya Raina
10	169	Sakshi Sharma
11	193	Milan Preet Kour
12	253	Ashu Sharma
13	275	Neetu Upadhyay
14	359	Tania Saini
15	363	Vanshika Gupta
16	371	Shruti Sharma
17	387	Shalvi Saini
18	395	Sneh Choudhary

19	399	Tania Saini
20	407	Zareena Bibi
21	423	Satish Bhagat
22	431	Minakshi Sharma
23	457	Babita Kumari
24	459	Anju Devi
25	463	Manpreet Kour

***Projects were assigned through online mode.**

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Projects assigned to the students of Semester-VI for the session 2020-21

Title of the Project*: Theories of Catalysis.

S.No	Roll No.	Name of the student
1	27	Priyanka Singh
2	29	Sonika Sharma
3	61	Iqra Jan
4	77	Shivani Sharma
5	101	Stanzin Wangmo
6	117	Stanzin Nagsal
7	149	Tahira Kossar
8	153	Simran Pandoh
9	159	Dardot Wangmo
10	165	Kajal Dogra
11	191	Manaz Kouser
12	195	Komal Sharma
13	375	Vaishali Dogra
14	427	Jigmat Palmo

***Projects were assigned through online mode.**

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Table-1: List of projects assigned to students of semester III (session 2020-2021)

S. No	Name of the project	Roll Numbers	Faculty
01	Study different Seed dispersal mechanism	1-15	Dr Riyaz Ahmad Dr Masrat Jan
02	Collection of monocot plant species in your area	16-30	Dr Riyaz Ahmad Dr Masrat Jan
03	Collection of dicot plant species in your area	31-45	Dr Riyaz Ahmad Dr Masrat Jan
04	Study of leaf shape diversity	46-60	Dr Riyaz Ahmad Dr Masrat Jan
05	Epidermal modification in plants (Trichomes and stomata)	61-75	Dr Riyaz Ahmad Dr Masrat Jan
06	Carbon cycle	76-90	Dr Riyaz Ahmad Dr Masrat Jan
07	Water cycle	91-105	Dr Riyaz Ahmad Dr Masrat Jan
08	Green house effect	106-120	Dr Riyaz Ahmad Dr Masrat Jan
09	Soil profile	121-135	Dr Riyaz Ahmad Dr Masrat Jan
10	Grazing food chain	136-150	Dr Riyaz Ahmad Dr Masrat Jan
11	Detritus food chain	151-165	Dr Riyaz Ahmad Dr Masrat Jan
12	Ecological pyramids	166-180	Dr Riyaz Ahmad Dr Masrat Jan
13	Life forms	181-195	Dr Riyaz Ahmad

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			Dr Masrat Jan
14	Hydrosere	196- 210	Dr Riyaz Ahmad Dr Masrat Jan
15	Xerosere	211-259, 301-308, 336-344,rest of the roll no's	Dr Riyaz Ahmad Dr Masrat Jan

NAME OF THE STUDENTS	ROLL NO.S
PALVI DEVIKOTWAL	1
SHALLU KHAJURIA	2
TASHI CHUSKIT	3
SHIVANI BALA	4
MEHAK KACHRU	5
GURLEEN KOUR	6
SHIVANI MEHRA	7
HARMANJEETKOUR	8
SHIVANISHARMA	9
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Botany

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تحقیقی مضامین برائے سال 2021

منسلکات تحقیقی مضامین طلباء نے سال 2021 میں لکھ کر شعبہ اردو میں جمع کرائے اور ان مضامین کا مقصد یہ تھا کہ طلباء میں کو تحقیقی مقالات لکھنے کی طرف راغب کیا جائے نیز مضامین طلباء کے معیار تعلیم اور تحقیق کو مدنظر رکھ کر لکھوائے گئے ان میں مضامین اور طلباء کی فہرست بھی شامل کی گئی ہے

نام طالبہ	مضمون کا نام	رول نمبر
۱۔ ارم النساء	وقت ایک انمول نعمت	2561
۲۔ ام سلمیٰ	ناول کیا ہے	1758
۳۔ حیا لقیس	برج بالو ایک تنقیدی جائزہ	2154
۴۔ حسینہ کوثر	افسانہ نگاری	2298
۵۔ عائشہ کوثر	بہادر شاہ ظفر	1933
۶۔ تانیہ بانو	اردو ڈراما	2539
۷۔ نازنین کوثر	پیاری ماں	1836
۸۔ شازیہ خاتون	خمریات	2937
۹۔ سرنگ چوہکر	قطعہ	2627

The Research Project conducted by the student of Deptt of Urdu during the year 2021

SNo ; Name of Students : Topic.

01- Asim-ul Nisa. Waqeit Aik Ammool Namit

02. Am-Saloza Naval Kija hey -

03 Sabaul-Najis. Barij Bano Aik Tanqudi Matal.

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06 Tasia Bano Urdu ~~Darama~~ Drama

07. Nazneem Kowsar Pajari ~~Main~~ Ma

08 Shazia Khatoon Gazalat.

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(Erstwhile Maharani Mahila College)

Autonomous college affiliated to the University of Jammu

(Estd. 1944)

Response to DVV clarification for metrics ID 1.3.4

Response-2

<u>Declaration</u>

Certified that no field visit could be undertaken during the academic year 2020-21 due to Covid-19 Pandemic.

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Response to DVV clarification for metrics ID 1.3.4

Response-3

No student has undertaken internship during the academic session 2020-21 due to Covid-19 Pandemic.

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Response to DVV clarification for metrics ID 1.3.4

Response- 4

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CHEMISTRY PROJECT

Name - Anjali CHIB
Class - BSc Sem VIth
Roll no - 128
Topic - Catalyst

Homogeneous and heterogenous Catalyst with Catalytic steps and examples

Teacher name :- Prof. Anjali Abrol.

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CATALYST

A catalyst is a substance that alters the rate of chemical reaction without being consumed.

Actually, a catalyst does not change the negative energy characteristics of the reactant and products or the energy barrier between them. It provides the alternative reaction pathway that bridges reactant and products.

The process of alternation, acceleration or retardation of the rate of a chemical reaction using a catalyst is called catalysis.

Types of catalyst :-

(i) On the basis of physical state of reactants, Catalyst are of two types :-

1. HOMOGENEOUS CATALYST :- In a chemical reaction, when the catalyst is present in the same phase as the reactants, it is called homogeneous catalyst and the type of the catalysis is called homogeneous catalysis.

Example :- $RCOOR'(l) + H_2O(l) \xrightarrow[\text{catalyst}]{H^+(aq)} RCOOH(l) + R'OH(l)$

$$2SO_2(g) + O_2(g) \xrightarrow[\text{catalyst}]{NO(g)} 2SO_3(g)$$

2. HETEROGENEOUS CATALYST :- In a chemical reaction when the catalyst is present in different physical state from the reactants, it is called heterogeneous catalyst. This type of catalyst is present in "heterogeneous" catalysis.

Example :- $N_2(g) + 3H_2(g) \xrightarrow[\text{catalyst}]{Fe(s)} 2NH_3(g)$

3) On the basis of acceleration or retarding effect of catalyst on the rate of reactions:-

1. Positive catalyst :- A catalyst which accelerates the rate of reaction is called Positive Catalyst.

It actually lowers down the activation energy requirement for the occurrence of a chemical reaction.

Example :- Haber's Process :- $N_2(g) + 3H_2(g) \xrightarrow[\text{catalyst}]{Fe(s)} 2NH_3$

2. Negative Catalyst :- A catalyst which retards the rate of reaction is called a negative catalyst.

It functions either by acting as a poison or by breaking a chain of the reaction and hence it is also known as an Inhibitor.

Example - The tetraethyl lead retards the ignition / combustion of petrol.

General principles of Catalyst :-

Consider a reaction.

$$X + Y \xrightarrow{C} Z$$

Here, X and Y are reactants while Z is a product of the reaction. C represents a catalyst.

Mechanism of the reaction includes following steps:

Step 1:- $X + C \longrightarrow XC$ — (i)

Catalyst is consumed by one of the reactants (X) to form intermediate (i).

Step 2:- $XC + Y \longrightarrow XYC$ — (ii)

Intermediate (i) combine with reactant Y to form intermediate (ii)

Step 3:- $XYC \longrightarrow CZ$ — (iii)

Intermediate (ii) subsequently changes to intermediate (iii)

Step 4:- $CZ \longrightarrow C + Z$ — (iv)

Intermediate (iii) decomposes to give the product (Z) and the catalyst HCl is regenerated in the end

Properties of a catalyst:-

1. A catalyst reduces the activation energy of the reaction.
2. At the end of the reaction, there is no chemical change in a catalyst though it may undergo a physical change.
3. Very small amount of catalyst is required to carry out a reaction.
4. A catalyst is more effective and reactive in powdered form than a lump form, because powder form has more surface than lump form and this increases the no. of active sites and so the activity of catalyst increases.
5. Selectivity of catalyst helps in the production of the desired products only and a very small amount of side products.
6. Specific nature of catalyst allows the production of different products according to the need.

Applications of a Catalyst :-

i) They help in energy production
ii) They help in chemicals and polymer production
iii) They help in Pollution Control
iv) They help in Pharmaceuticals and food industry

Homogeneous Catalysis :-

Definition :- The process of catalysis in which the catalyst and the reactants are in the same phase and are evenly distributed throughout is called Homogeneous Catalysis.

For example :- In the reaction of the depletion of Ozone layer, the reactants as well as the catalyst is present in gaseous phase. Hence it is homogeneous catalysis.

$$2O_3(g) \xrightarrow[Catalyst]{Cl(g)} 3O_2(g)$$

Some other examples of Homogeneous Catalysis are: Acid Catalysed condensation, Decomposition of Acetaldehyde etc.

CATALYTIC STEPS :-

The catalytic steps for a homogeneous catalysis are given below :-

1. Ligand co-ordination and dissociation :-

This involves the facile co-ordination of reactants to metal ions and facile loss of products from the co-ordination sphere. Both [illegible] [illegible] with [illegible] [illegible] metal complexes are involved. These [illegible] complexes are co-ordinatively unsaturated [illegible], and that they contain an important co-ordination site [illegible] [illegible] a site that is [illegible] easily co-ordinated.

Square planar 16 electron complexes are co-ordinatively unsaturated and are often employed to catalyse the reactions of organic molecules.

2. Insertion and Elimination : The reaction involves the migration of alkyl and hydride ligands to the unsaturated ligand.

3. Nucleophilic attack on co-ordinated ligands :- The co-ordination of ligands such as CO and alkenes to metal ions in positive oxidation states results in the activation of the co-ordinated [illegible] states results in the activation of the co-ordinated [illegible] towards attack by nucleophiles. Such reactions are useful in catalysis as well as in organometallic chemistry.

The hydration of ethene catalysed by Pd (II) is a good example of catalysis by nucleophilic activation.

The stereochemical evidence indicates that the reaction occurs by direct attack on the most highly substituted C-atom of the coordinated olefin.

Similarly, a co-ordinated CO ligand is attacked by nucleophile at the C atom, forming a C-bound group, which subsequently loses CO_2.

$$L_nM-CO + OH^- \longrightarrow L_nM-\overset{O}{\overset{\|}{C}}-OH \longrightarrow L_nM-H + CO_2$$

iii) Oxidation and Reduction: Metal complexes are often used for the catalytic oxidation of organic substances (substrates) and in the catalytic cycle the metal atom alternates between two oxidation states, eg. [illegible], [illegible], Co^{2+}/Co^{3+}, Mn^{2+}/Mn^{3+}, Pd^{0}/Pd^{2+} etc.

Catalysts containing metal ions are used in large scale processes for the oxidation of hydrocarbons e.g. in the oxidation of p-xylene to terephthalic acid. The metal ion can play several roles in these radical oxidations as seen from the following mechanisms:

Initiation: [illegible] (Free Radical Initiation).

Propagation [illegible]

Termination :-

[illegible]

A metal [illegible] as [illegible]

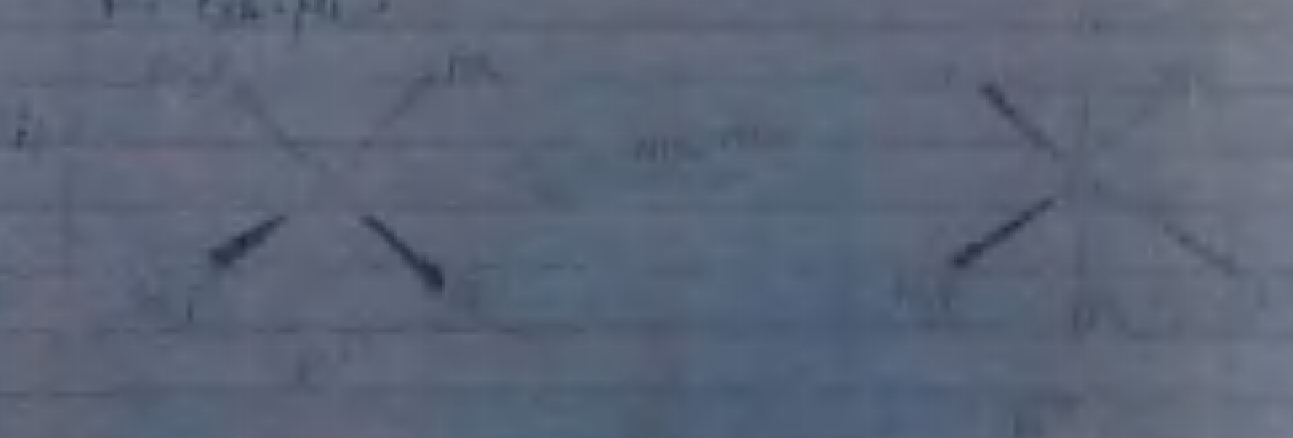
[illegible] (Redox process)

Oxidative addition and Reductive elimination :-

When reaction of [illegible] is accompanied by [illegible] of metal it is called oxidative addition reaction, i.e.

[illegible]

For example :-



Reductive elimination is the reverse of oxidative addition in this reaction. Oxidation state of metal decreases while forming new covalent bond.

Example:-

1. Acid Catalysed Condensation:-

Acid catalysed synthesis of ethyl acetate ester from ethanol and acetic acid

$$CH_3CH_2OH + CH_3COOH \longrightarrow CH_3-\overset{O}{\overset{\|}{C}}-O-CH_2-CH_3 + H_2O$$

(Ethanol) (Acetic acid) (Ethyl acetate)

2. Acid Catalysed Dehydration:-

Synthesis of ethyl alcohol to Ethylene

[illegible]

Ethyl alcohol   Ethylene

• Hydrolysis of Esters:

Hydrolysis of esters to form the corresponding acid and alcohol.

• Acid or base catalysed halogenation:

Ketones can be halogenated by the formation of enol or base and X_2 ($X = Cl, Br$)

• Catalysis by Metal ions

Metal ions can act as Lewis acid. It introduces positive charge into substrate making it more

[illegible]

(ii) Metal ions can also act as "template" metal ions are able to coordinate to more than 1 ligands and thereby bring the molecules together.

(iii) Metal ions can also act as redox catalyst; many metal ions can accept or donate electrons by changing their oxidation state and thereby participate in redox reactions.

Heterogeneous Catalysis:-

Definition:- The process of catalysis in which the catalyst and the reactants are present in different phases is called Heterogeneous Catalysis.

Examples

(i) Hydrogenation of olefins to saturated hydrocarbons.

$$H_2C = CH_2(g) + H_2(g) \xrightarrow{Ni/Pt} CH_3 - CH_3(g)$$

(ii) Oxidation of ammonia to nitric oxide

$$4NH_3(g) + 5O_2(g) \xrightarrow{Pt,\ 1100K} 4NO(g) + 6H_2O(g)$$

Catalytic Steps:-

A solid catalytic reaction (A → B) goes through the following steps illustrated in fig. [illegible]

[illegible]

1. Transport of reactant (A) from bulk fluid to pore mouth on the external surface of catalyst pellets.
2. Diffusion of reactant (A) from the pore mouth through catalyst pellet to the immediate vicinity of internal catalytic surface.
3. Adsorption of reactant (A) from the catalyst surface
4. Reaction of (A) on the catalytic surface producing product (B)

1. Desorption of the product (C) from the surface.
2. Diffusion of product (C) from the part of pores to the mouth of the catalyst surface.
3. Transfer of product (C) from pore mouth on the catalyst surface to the bulk fluid.

MECHANISM:

Heterogeneous catalysis completes in four steps given below:
Adsorption of the reactant onto the surface of the catalyst.
2. Activation of the adsorbed reactant.
3. Reaction of the adsorbed reactant.
4. Diffusion of the product from the surface into the gas or liquid phase.

Industrial Applications:

1. Hydrogenation of Ethene to Ethane:

$$C_2H_4 + H_2 \xrightarrow[140°C]{Ni} C_2H_6$$

* Dehydrogenation :- Some of the examples of dehydrogenation are

⇒ Alkanes $\xrightarrow[\text{[illegible]}]{Cr_2O_3}$ Alkenes

⇒ Ethyl benzene $\xrightarrow[\text{[illegible]}]{Fe_2O_3 \text{ [illegible]}}$ Styrene

3 Oxidation :- Some examples of oxidation are given below

→ SO_3 production :- $SO_2 \xrightarrow{O_2} SO_3$

→ Methanol to formaldehyde

$$CH_3OH + \frac{1}{2} O_2 \longrightarrow HCHO + H_2O$$

Name :- Mansi Sharma
Roll no :- 388
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1) What are the characteristics of battery? Discuss the working of lead Acid battery?

Ans :- The characteristics of battery are as follows :-

1) Voltage :- The theoritical Standard Cell voltage can be determined from electrochemical series using E° values.

$E^\circ(\text{cathodic}) - E^\circ(\text{anodic}) = E^\circ \text{cell}$

This is the theoritical voltage.

2) Discharge Curve :- The discharge curve is a plot of voltage against percentage of capacity discharged. A flat discharge curve is desirable as this means that the voltage remains constant as the battery is used up.

3) Capacity :- The theoritical capacity of a battery is the quantity of electricity involved in the electro-chemical reaction. It is denoted Q and is given by ;

$Q = xnF$, where x is no. of no of moles of reaction, n is no of electrons

transferred per mole of reaction and F is Faraday's constant.
The capacity is usually given in terms of mass, not the no. of moles.

$$Q = \frac{nF}{M_r}, \text{ where}$$

M_r is Molecular Mass. This gives capacity in units of Ampere-hours per gram (Ah/g).

4) Energy density :- The energy density is the energy that can be derived per unit volume of weight of cell.

5) Power density :- It is the power that can be derived per unit weight of cell (W/kg).

6) Specific Energy density :- It is the energy that can be derived per unit weight of cell.

7) Temperature dependence :- The rate of reaction in the cell will be temp. dependent according to theories of kinetics.

9) Service life:- The battery cycle life for a rechargeable battery is defined as the no of charge cycles, a secondary battery can perform before its capacity falls to 80% of what it originally was.

10) Physical requirements:- This includes the geometry of cell, its size, weight and shape and location of terminals.

11) Cost:- This includes initial cost of battery itself as well as cost of charging and maintaining battery.

12) Ability for deep discharge:- There is a logarithm relationship between the depth of discharge and the life of a battery, thus life of a battery can be significantly increased if it is not fully discharged, eg:- a mobile phone battery will last 5-6 times longer if it is only discharged 80% before recharging.

13) Application requirements:- The battery must be sufficient for intended application. This means that it must be able to produce right current with right voltage. It must have sufficient capacity, energy and power.

→ Lead Acid Battery

Lead Acid Battery comes under classification of rechargeable and Secondary batteries. This corresponds that lead acid cells possess a high amount of power to weight proportions. These are the batteries that utilize lead peroxide and Sponge lead to convert chemical energy. These are mostly employed in substations and power systems due to the reason they have increased cell voltage levels and minimal cost.

Construction - In lead acid battery constr-uction, the plates and containers are the crucial components. The below Section provides a complete package used for construction.

Working of Lead Acid Battery :-

As Sulphuric acid is used as an electrol-yte in the battery, when it gets dissolv-ed, the molecules in it are dispersed as SO_4^- and $2H^+$ and these will have free movement. When these electrodes are dipped in solutions and provide a DC Supply, then positive ions will have a movement and move towards

REDMI NOTE 5 PRO

direction of negative edge of battery. In the same way, negative ions will have a movement and move towards direction of negative edge of battery. In the same way the negative ions will have a movement and move towards the direction of positive edge of battery.

Every hydrogen and Sulfate ions collect one and two electron and negative ions from cathode and anode and they have a reaction with water. This forms hydrogen and Sulphuric acid. Whereas the developed from above reactions react with lead oxide and forms lead peroxide. This means at the time of the charging process, the lead Cathode element stays as lead itself whereas lead anode is formed as lead peroxide which is dark brown in colour.

When there is no DC Supply and then at the time when a voltmeter is connected in between electrodes, it displays the potential difference between electrodes. When there is a connection of wire between electrodes, there will be passage of current from negative to positive plate via an external circuit which signifies that the cell holds ability to provide an electric form of energy. So, this shows lead acid battery Working.

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SEMESTER : 6th (VI)

ROLL NO. : 16

CHEMISTRY PROJECT :

ON BATTERIES

TITLE OF THE PROJET :

A. CHARACTERISTICS OF BATTERY

A.1) WORKING OF LEAD ACID BATTERY.

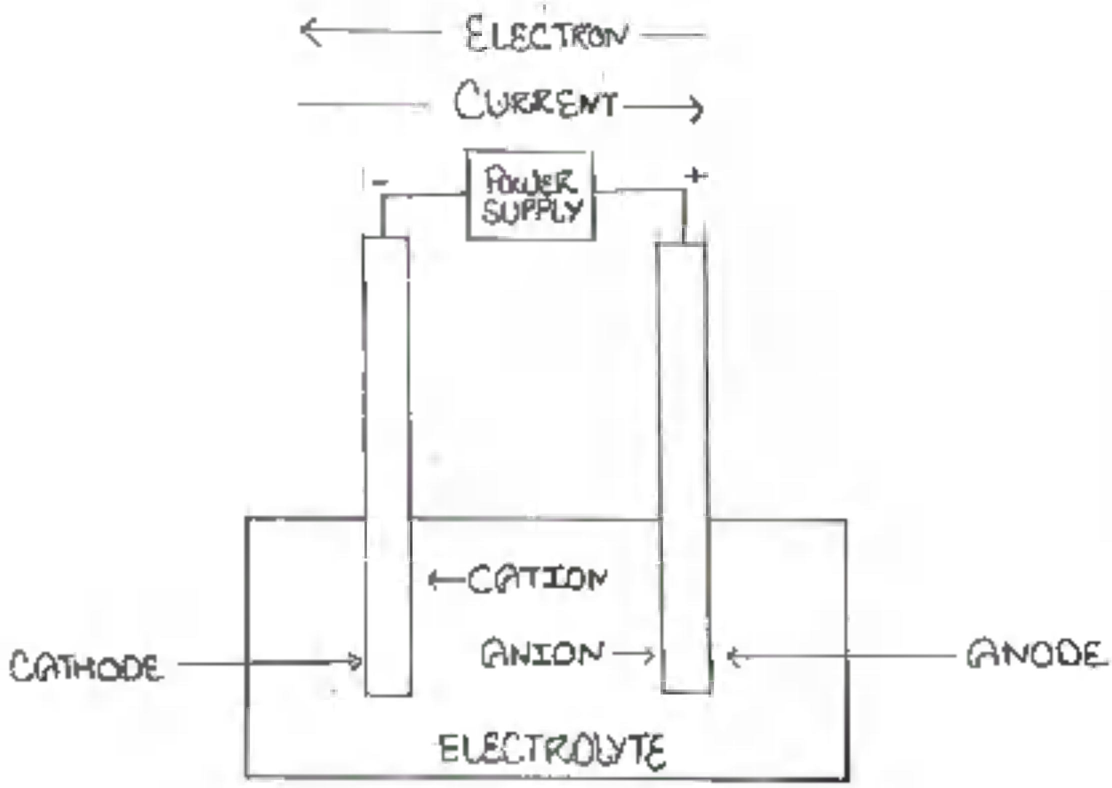
INTRODUCTION

BATTERIES

An electrochemical cell is a device capable of either generating electrical energy from chemical reactions or using electrical energy to cause chemical reactions.

The electrochemical cells which generate an electric current are called Voltaic cells or galvanic cells and the other ones are called electrolytic cells which are used to drive chemical reactions like electrolysis.

A battery consists of one or more cells, connected either in parallel, series or series - and - parallel pattern. Electrochemical cells or batteries are classified into four broad categories: These are, Primary cell, Secondary cell, Reserve Batteries, Fuel cells.



COMPONENTS OF A BATTERY

CHARACTERISTIC OF BATTERY

1. A battery is composed of one or more cells, either parallel or series connected to obtain a required current / voltage capability (batteries comprised of series connected cells are by far the most common).

2. A battery can be used only once (Primary battery) or it can be used again and again after recharging (Secondary battery).

3. mAh and Ah : The term mAh is an abbreviation for "milliampere hour" and it is a way to express the electrical capacity of smaller batteries. With larger batteries, like car batteries, we usually use ampere hours, or Ah. There are 1000 mAh in a single Ah. mAh is calculated by multiplying the amount of time the battery lasts by the amperes of the discharge current.

   mAh = Time × 1 Amperes of discharge current.

4. ESR (Equivalent Series Resistance) is the internal resistance present in any cell that limits the amount of peak current it can deliver.

5. The Amp-hour capacity of a battery (or cell) is its most important figure of merit, it is defined as the amount of current that a battery can deliver for 1 hour before the battery voltage reaches the end-of-life point.

6. The "C" rate is a current that is numerically equal to the A-hr rating of the cell. Charge and discharge currents are typically expressed in fractions or multiples of the C rate.

Slow charging "Slow" charge is defined as a charging current that can be safely applied to a battery indefinitely without any kind of monitoring or charge termination method (it is sometimes referred to as trickle charging).
A typical Ni-Cd battery will easily tolerate C/10, and some fast-charge Ni-Cd cells will accept up to C/3.

Fast charging "Fast" charge (usually defined as a 1 hour recharge) requires more complex charging circuitry (again raising the system cost) but gives the customer faster charging time (a very attractive selling point). The typical Ni-Cd or Ni-MH fast charger simply pumps current into the battery and waits for the battery to signal when it had enough. Because of the possibility of battery damage and user safety hazards, fast-charge systems must be designed to accurately monitor battery parameters (i.e. cell temperature and voltage

7. **Recharge Time** : The amount of time that the typical consumer finds acceptable for battery recharging is highly variable, and depends on the item being powered.

8. The MPV (mid-point voltage) is the nominal voltage of the cell, and is the voltage that is measured when the battery has discharged 50% of its total energy.

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9. The measured cell voltage at the end of its operating life is called EODV, which stands for End of Discharge Voltage (some manufacturers refers to this as EOL or End of life voltage).

10. The gravimetric energy density of a battery is a measure of how much energy a battery contains in comparison to its weight.

11. The volumetric energy density of a battery is a measure of how much energy a battery contains in comparison to its volume.

12. Peak Current : The maximum current that a battery can deliver is directly dependent on the internal equivalent series resistance (ESR) of the battery. The current flowing out of the battery must pass through the ESR, which will reduce the battery terminal voltage by an amount equal to the ESR multiplied times the load current ($V = I \times R$). More important, the current flowing through the ESR will cause power dissipation

within the battery that is equal to the ESR multiplied times the current squared.

$$(P = I^2 \times R).$$

This can result in significant heating within the battery at high rates of discharge.

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LEAD ACID BATTERY

The battery which uses sponge lead and lead peroxide for the conversion of the chemical energy into electrical power, is called a lead acid battery.

The lead acid battery is most commonly used in antimobiles, inverter, power stations etc. because it has higher cell voltage and lower cost.

It is oldest rechargeable battery and was invented by Gaston Plante in 1859.

Graston Plante in 1859.

WORKING OF LEAD ACID BATTERY

The lead acid storage battery is formed by dipping lead dioxide plate and sponge lead plate in dilute sulphuric acid. A load is connected externally between these plates. In dilute H_2SO_4, the molecules of acid split into positively charged H^+ ions and negatively charged SO_4^{2-} ions. The H^+ ions on reaching PbO_2 plate receive electrons from it and become H- atoms, which attack PbO_2, thereby forming PbO and H_2O.

The PbO reacts with H_2SO_4 and forms $PbSO_4$ and H_2O.

Reactions Involved During Discharging

At Cathode

$$PbO_2 + 2H \longrightarrow PbO + H_2O$$
$$PbO + H_2SO_4 \longrightarrow PbSO_4 + H_2O$$

$$PbO_2 + H_2SO_4 + 2H \longrightarrow PbSO_4 + 2H_2O$$

SO_4^{2-} ions moving freely in the solution, some of them reach at pure Pb plate, thereby forming $PbSO_4$, and lose two electrons per ion there. Since there would been inequality of electrons between these two plates, hence there would be a flow of current through the external load between these two plates.

<u>At</u> <u>Anode</u>: $Pb(S) + SO_4^{2-}(aq) \longrightarrow PbSO_4(S) + 2e^-$

This process is called discharging of lead-acid battery and it leads to the accumulation of $PbSO_4$, and there is fall in the specify gravity of sulphuric acid solution. As a result, the rate of reaction falls due to the decrease in the potential difference between the plates.

The battery needs recharging when the density of H_2SO_4 falls below $1.20\ g\,cm^{-3}$. During recharging, the cell is operated like an electrolytic cell. As the density of H_2SO_4 falls but there is still H_2SO_4 existing in the solution. On the application of electric current, H^+ ions move to the electrode (cathode) connected to negative terminal of the DC source. Here each H^+ ion takes one electron from that and becomes hydrogen atom.

These H-atoms then attack $PbSO_4$ leading to the formation of Pb and H_2SO_4.

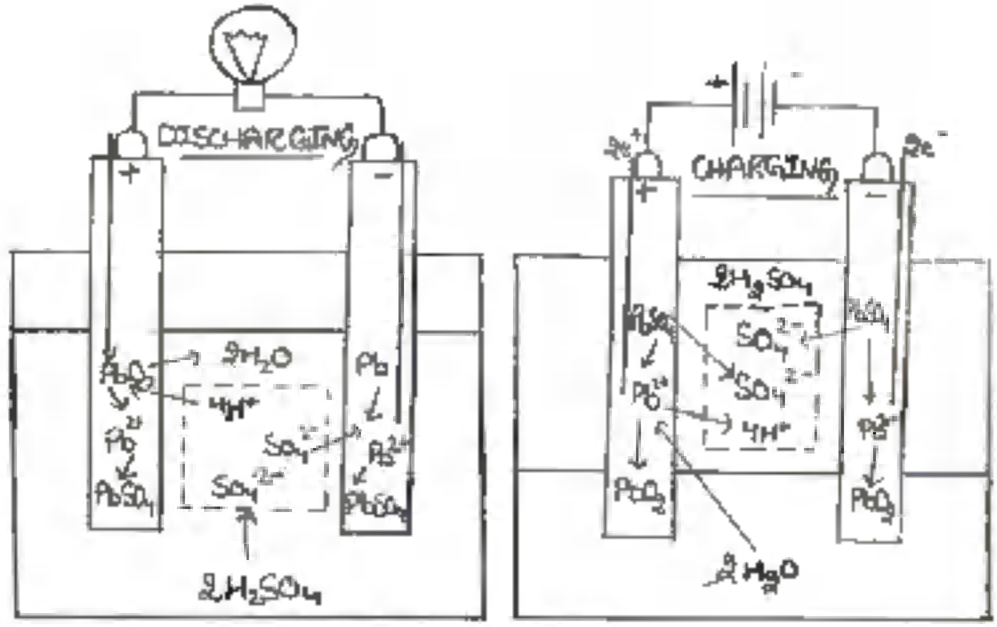
$$PbSO_4 + 2H \longrightarrow H_2SO_4 + Pb$$

On the hand, SO_4^{2-} ions move towards the electrode (anode) connected with the positive terminal of DC source where they will give up their extra electrons and become radical SO_4. The radical SO_4 cannot exist alone and forms PbO_2 and H_2SO_4.

$$PbSO_4 + 2H_2 + SO_4 \longrightarrow PbO_2 + 2H_2SO_4$$

Hence, during charging, the specific gravity of H_2SO_4 and potential of cell increases.

WORKING OF LEAD ACID BATTERY



A. B.

Lead - acid battery Chemistry

A). During discharging

B). During charging

ASSIGNMENT - CHEMISTRY

Name - Ritika Bharti

Class - 6th semester

Roll no - 280

"Topic - What are explosive? Discuss explosive properties of PETN and cyclonite. Give brief note on rocket proplants".

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Explosives -

An explosive is a reactive substances that contains a great amount of potential energy that can produce an accompanied by the production of light, heat sound and pressure. An explosive charge is a measured quantity of explosive material, which may either be composed, solely of one ingredient or be a mixture containing atleast 2 substances.

The potential energy stored in an explosive material may, for example, be -

- Chemical energy, such as nitroglycerine or grain dust
- pressurized gas, such as gas cylinder, aerosol can, or BLEVE.
- Nuclear energy, such as in the fissile isotopes, uranium -235 and plutonium -239

Explosive materials may be categorized by the speed at which they expand. Materials that detonate are said to be "high explosives" and materials that deflagrate are said to be "low explosive". Explosives may also be categorized by their senstivity. Senstive materials that can be initiated by a relatively small amount of heat or pressure are prim-ary explosives and materials that are relatively insenstive are secondary or tertiary explosives.

A wide variety of chemicals can explode; a smaller number are manufactured specifically for the purpose of being used as explosives. The remainder are too dangerous, sensitive, toxic, expensive, unstable or prone to decomposition or degradation over short time spans.

In contrast, some materials are merely combustible or flammable if they burn without exploding.

The distinction, however, is not razor sharp. Certain materials-dusts, powders, gases or volatile organic liquids - may be simply combustible or flammable under ordinary conditions, but become explosive in specific situations or forms, such as dispersed airborne clouds, or confine-ment or sudden release.

HISTORY

Early thermal weapons such as Greek fire, have existed since ancient times. As its roots, the history of chemical explosives lies in the history of gunpowder. During the Tang dynasty in the 9th century, Taoist chinese alchemists were eagerly trying to find the elixir of immortality. In the process, they stumbled upon the explosive invention of black powder made from coal, saltpeter and sulfur in 1044.

Gunpowder was the first form of chemical were using explosives for the first time in the warfare. The chinese would incorporate explosives fired from bamboo or bronze tubes known as bamboo fire crackers. ~~fired~~ The chinese also inserted live rats inside the bamboo fire crackers when fired towards the enemy, the flaming rats created great psychological ramifications- scaring enemy soldiers away and causing cavalry units to go wild.

The first useful explosives stronger than black powder was nitroglycerin, developed in 1847. Since nitroglycerine is a liquid and highly unstable, it was replaced by nitrocellulose, trinitrotoulene (TNT) in 1863, smokeless powder, dynamite in 1867 and gelignite (the latter two being sophisticated stabilized preparations of nitroglycerine rather than chemical alternatives, both invented by Alfred Nobel) World war I saw the adoption of TNT in artillery shells. World war II saw an extensive use of new explosives.

In turns, these have largely been replaced by more powerful explosives such as C-4 and PETN. However, C-4 and PETN react with metal and catch fire easily, yet unlike TNT, C-4 and PETN are waterproof and malleable.

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APPLICATIONS

Commercial - The largest commercial application of explosives is mining. Whether the mine is on the surface or is buried underground, the detonation or deflagration of either a high or low explosive in a confined space can be used to liberate a fairly specific sub-volume of a brittle material in a much larger volume of the same or similar material.

- Military - Explosive weapons are used by military during battles, wars or in tackling the terrorists.
- Civillian - Explosive engineering is the field of science and engineering which is related to examining the behaviour and usage of explosive materials.
- Chemical - Explosive is a type of spontaneous chemical reaction that, once initiated, is driven by both a large exothermic change (great release of heat) and a large positive entropy change (great quantities of gases are released in going from reactants to products, thereby constituting a thermodynamically favourable process in addition to one that

propogates very rapidly. Thus, explosives are substances that contain a large amount of energy stored in chemical bonds.

Decomposition- The chemical decomposition of an explosive may take years, days, hours or a fraction of a second.

Of more interest are the other two rapid forms besides decomposition - deflagration and detonation.

PETN

Pentaerythritol tetranitrate also known as PENT, PENTA, TEN, corpent or penthrite, is an ~~example~~ explosive material. It is the nitrate ester of pentaerythritol, and is structurally very similar to nitroglycerine. Penta refers to the five carbon atoms of the neopentane skeleton. PETN is an powerful explosive material with a relative effectiveness factor of 1.66 when mixed with a plastic explosive. Along with RDX it is the main ingredient of Semtex.

History - Pentaerythritol tetranitrate was first prepared and patented in 1894 by the explosives manufactures Rheinisch Westfalische sprengstoff A.G of Cologne, Germany. The production of PETN started in 1912, when the improved method of production was patented by the German government. PETN was used by the Milliatry in World war I. It was used in the MG FF/M autocannons and many other weapon systems of the Luftwaffe in World war II, specifically in the high explosive Mine shell.

Properties -

PETN is practically insoluble in water, weakly soluble in common non-polar solvents such as aliphatic hydrocarbons (like gasoline) or tetra chloromethane, but soluble in some other organic solvents, particularly in acetone and dimethylformamide. PETN forms eutectic mixtures with some liquid or molten arom-atic nitro compounds example - Trinitroto-luene (TNT) or tetryl. Due to steric hinder-ance of the adjacent neopentyl - like moiety, PETN is resistant to attack by many chemical reagents; it does not hydrolyze in water at room temperature or in weaker alkaline aqueous solutions. Water at 100°C or above causes hydrolysis to denitrate; presence of 0.1% nitric acid accelerates the reation.

The chemical stability of PETN is of interest, because of PETN in aging weapons. A review has been published. Neutron degradation PETN, producing carbon dioxide and some pentaerythritol dinitrate and trinitrate.

Gamma radiation increases the thermal decomposition sensitivity of PETN, lowers the MP° by few degree celcius, and causes swelling of the samples.

Like other nitrate esters, the primary degradation mechanism is the loss of nitrogen dioxide; this reaction is autoca-talytic. Studies were performed on thermal decomposition of PETN.

In the environment, PETN undergoes biodeg-radation. Some bacteria denitrate PETN to trinitrate and then dinitrate, which is then further degraded. Its toxic-ity is relatively low, and its transdermal.

Wallis also used Torpex.

RDX is believed to have been used in controlled demolition to raze structures. The demolition of Jamestown bridge in the US state of Rhode island was one instance where RDX shaped charges were used to remove the span.

History

RDX was used by both sides in WW II. The U.S produced about 15,000 long tons per month during WW II and Germany about 7000 long tons per month. RDX had the major advantages of possessing greater explosive force that TNT, used in WW I, and requiring no additional raw materials for its manufacture.

Stability -

RDX has a high nitrogen content and a high O:C ratio, both of which indicate its explosive potential for formation of N_2 and CO_2.

RDX undergoes a deflagration to detonation transition of RDX at a density of 1.76 $g\,cm^{-3}$ is 8750 ms^{-1}. It starts to decomposes at

RDX

RDX is an organic compound with the formula $(O_2N_2CH_2)_3$. It is a white solid without smell or taste, widely used as an explosive. Chemically, it is classified as a nitroamine alongside HMX, which is a more energetic explosive that TNT. It was widely used in WWII and remains common in milliatery applications. RDX is often used in mixture with other explosives and plasticizers or phlegmetizers (desensitizers). It is stable in storage and is considered one of the explosives agent in C-4 plastic explosives. It has a relative effectiveness factor of 1.60.

Usage

RDX was widely used during WWII, often in explosive mixtures with TNT such as Torpex, composition B, Cyclotols and H6. RDX was used in one of the first plastic explosives. The bouncing bomb depth charges used in the "Dambusters raid" each contained 6,600 pounds (3,000 kg) of Torpex. The Tallboy and grand slam bombs designed by

Wallis also used Torpex.

RDX is believed to have been used in controlled demolition to raze structures. The demolition of Jamestown bridge in the US state of Rhode island was one instance where RDX shaped charges were used to remove the span.

History

RDX was used by both sides in WW II. The U.S produced about 15,000 long tons per month during WW II and Germany about 7000 long tons per month. RDX had the major advantages of possesing greater explosive force that TNT, used in WW I, and requiring no additional raw materials for its manufacture.

Stability -

RDX has a high nitrogen content and a high O:C ratio, both of which indicate its explosive potential for formation of N_2 and CO_2.

RDX undergoes a deflagration to detonation transition of RDX at a density of $1.76\ gcm^{-3}$ is $8750\ ms^{-1}$. It starts to decomposes at approximately 170°C and melts at 204°C. At room temperature, it is very stable. It burns rather than explodes. It denotes only with a detonator, being unaffected even by small arms fire. This property makes it is a useful milliatry explosives. It is less sensitive than PETN. Under normal conditions, RDX has a figure of Insensitivity of exactly 80 (RDX defines the reference point).

RDX ~~[illegible]~~ sublimes in vacuum, which restricts or prevents in use in some applications.

RDX, when exploded in air, has about 1.5 times the explosives energy TNT per unit weight and about 2.0 times per unit volume

RDX is insoluble in water, with solubility 0.05975 gL^{-1} at temperature of 25°C.

Project Work

DATE
PAGE

Name => Shakshi Balowria
Class :- 6th sem. B.Sc. Medical
Roll no.:- 156
Registration no :- 18GCPA1227
Subject :- Chemistry.

Topic :- Battery Working [Lead Acid Battery] and Characeristics of Battery :

Characeristics of Battery :-

a) A battery is composed of one or more cells, either parallel or series connected to obtain a required current/voltage capability.

b) A battery can be used only once or it can be used again and again after recharging.

c) mAh and Ah : The term mAh is an abreviation for "milliampere hour", and it's a way to express the electrical capacity of smaller batteries. With larger batteries, like car batteries, we usually use ampere hours, or Ah. There are 1000mAh in a single Ah. mAh is calculated by multiplying the amount of time the battery lasts by the amperes of the discharge current.

mAh = Time X I Amperes of dischargecurrent

d) ESR (Equivalent series Resistance) is the internal resistance present in any cell that limits the amount of peak current it can delivers

e) The Amp-hour capacity of a battery (or cell) is its most important figure of merit, it is defined as the amount of current that a battery can deliver for 1 hour before the battery voltage reaches the end-of-life point.

f) The "c" rate is a current that is numerically equal to the A-hr rating of the cell. Charge and discharge currents are typically expressed in fractions or multiples of the c rate.

Show charging "slow" charge is defined as a charging current that can be safely applied to a battery indefinitely without any kind of monitoring or charge termination method. A typical Ni-Cd battery will easily tolerate c/10, and some fast-charge Ni-Cd cells will accept up to c/3.

Fast charging "fast" charge requires more complex charging circuitry but gives the customer faster charging time. The typical Ni-Cd or Ni-MH fast charger simply pumps current into the battery and waits for the battery to signal when it had enough. Because of the possibility of battery damage and user safety hazards, fast-charge systems must be designed to accurately monitor battery parameters like cell temperature and voltage.

g) Recharge Time: The amount of time that the typical consumer finds acceptable for battery recharging is highly variable, and depends on the item being powered.

h) The MPV (mid-point voltage) is the nominal voltage of the cell, and is the voltage that is measured when the battery has discharged 50% of its total energy.

i) The measured cell voltage at the end of its operating life is called EODV, which stands for End of discharge voltage.

j) The gravimetric energy density of a battery is a measure of how much energy a battery contains in comparison to its weight.

k) The volumetric energy density of a battery is a measure of how much energy a battery contains in comparison to its volume.

l) Peak Current: The maximum current that a battery can deliver is directly dependent on the internal equivalent series resistance (ESR) of the battery. The current flowing out of the battery must pass through the ESR, which will reduce

The battery terminal voltage by an amount equal to the ESR multiplied times the load current ($V = I \times R$). More important, the current flowing through the ESR will cause power dissipation within the battery that is equal to the ESR multiplied times the current squared ($P = I^2 \times R$). This can result in significant heating within the battery at high rates of discharge.

Working of Lead Acid Battery :-

The lead acid storage battery is formed by dipping lead dioxide plate and sponge lead plate in dil. sulphuric acid. A load is connected externally between these plates. In dil. H_2SO_4, the molecules of acid split into positively charged H^+ ions and negatively charged SO_4^{2-} ions. The H^+ ions on reaching PbO_2 plate receive electrons from it and become H-atoms, which attack PbO_2, thereby forming PbO and H_2O. This PbO reacts with H_2SO_4 and forms $PbSO_4$ and H_2O.

Reactions Involved during Discharging

At Cathode

$$PbO_2 + 2H \longrightarrow PbO + H_2O$$
$$PbO + H_2SO_4 \longrightarrow PbSO_4 + H_2O$$
$$\overline{PbO_2 + H_2SO_4 + 2H \longrightarrow PbSO_4 + 2H_2O}$$

SO_4^{2-} ions moving freely in the solution, some of them reach at pure Pb plate, thereby forming

$PbSO_4$ and lose two electrons per ion there. Since there would be an inequality of electrons between these two plates, hence there would be a flow of current through the external load between these two plates.

At Anode : $Pb(s) + SO_4^{2-}(aq) \longrightarrow PbSO_4(s) + 2e^-$

This process is called discharging of lead-acid battery and it leads to the accumulation of $PbSO_4$, and there is fall in the specific gravity of sulphuric acid solution. As a result, the rate of reaction falls due to the decrease in the potential difference between the plates.

The battery needs recharging when the density of H_2SO_4 falls below $1.20\ g\ cm^{-3}$. During recharging, the cell is operated like an electrolytic cell. As the density of H_2SO_4 falls but there is still H_2SO_4 existing in the solution. On the application of electric current, H^+ ions move to the electrode (cathode) connected to negative terminal of the DC source. Here each H^+ ion takes one electron from that and becomes hydrogen atom. These H-atoms then attack $PbSO_4$ leading to the formation of Pb and H_2SO_4.

$$PbSO_4 + 2H \longrightarrow H_2SO_4 + Pb$$

On the other hand, SO_4^{2-} ions move towards the electrode (anode) connected with the

Positive terminal of DC source where they will give up their extra electrons and become radical SO_4. The radical SO_4 cannot exist alone and form PbO_2 and H_2SO_4.

$$PbSO_4 + 2H_2 + SO_4 \longrightarrow PbO_2 + 2H_2SO_4$$

Hence, during charging, the specific gravity of H_2SO_4 and potential of cell increases.

Advantages :-

a) Inexpensive and simple to manufacture.
b) The self-discharge is among the lowest of rechargeable battery systems.
c) Lead Content Capable of high discharge rates.

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CLASS : B.Sc VI Sem

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SUBJECT : Chemistry Project

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Classmate
Date:
Page: 1

CLASSIFICATION OF FERTILISERS :-

Fertilisers are classified on the bases of their origin, nutrients present, physical state of fertilisers, numbers of compounds present in fertilisers, etc. Some of these classifications and types are discussed below :

(A) Classification based upon sources :-
Based upon this criteria, fertilisers are of following three types :

1. Natural organic fertilisers : Such fertilisers are obtained from animals and plants some of these are

(a) Animal matter : Powdered dry fish and red dry blood from the slaughter house are important nitrogenous fertilisers

(b) Plant matter : oil cakes from cotton seed meal: linseed meal and caster cake belong to this class and contain 7%, 5.5% and 6% of nitrogen respectively.

(c) Farm yard manure :- Typical farmyard manure consists of cow dung, sheep dung and human excretions.

2. Natural inorganic fertiliser :-

(a) Rock phosphates : Finely divided rock phosphate, although insoluble in water, weather rapidly and may be used directly.

(b) Chile Saltpetre : Chilean deposits would not last for more than 250 yrs, even at present about 83% of the world's requirements of $NaNO_3$ came from artifical sources.

3. Artificial fertilisers :- One of the major problems for modern fertilizer Industry is to determine the most effective and economical material for supplying the nutrients. These may be developed under three groups, according to the nature of the element.

(a) Phosphorous fertilisers : They include ammonium phosphate, polyphosphates, Super phosphates etc.

(b) Nitrogenous fertilisers : This class of fertilizers include, urea, amonium nitrate, Calcium ammonium nitrate etc.

(c) Potassium fertilisers : Potassium chloride and potassium sulphate are example of these type of fertilizers.

(B) Based on their chemical composition:

Based upon this criterion, fertilizers are of three types:

1. organic products: Produced out of wastes of animal husbandry, plant decomposition products or products from waste treatment.

2. Mineral fertilisers: contains inorganic or synthetically produced organic compounds.

3. Synthetic soil conditioners: Its main function is to improve the physical properties of the soil.

(c) Based upon their Nutrient content:

Based upon this criteria fertilizers are of following four types:

1. Straight fertilisers: These fertilizers which supply only one of the three primary nutrients i.e nitrogen or phosphorous or potassium.

2. Compound fertilisers: Those fertilizers which contain two or three primary nutrients i.e nitrogen, phosphorous and potassium.

If fertilizer contains two primary nutrients then it is known as incomplete fertilizer eg: amonium phosphate contains two primary nutrients and if fertilizer contains all the three primary nutrients, then it is called complete fertilizer.

3. Mixed fertilizers : These fertilizers which are obtained by mixing two or more straight fertilizers in a particular ratio are known as mixed fertilizers. The mixing is done in industries or it can be done mannually by farmers. eg: a mixture of potassium chloride (KCl) and ammonium phosphate [$(NH_4)_2HPO_4$] provides all the three primary nutrients

⇒ To Estimate The Amount Of Calcium Present In The Given Sample Of Calcium Ammonium Nitrate :-

- Apparatus : Burette, burette stand, funnel, beaker, titration flask, pipette, glass rod, filter paper, funnel, measuring cylinder, measuring flask etc.

- Theory : Calcium ammonium nitrate is made by adding powdered limestone to ammonium nitrate or its manufacturing process involves reaction of lump limestone with concentrated nitric acid, addition of ammonia to neutralise excess of acid, evaporation of the resulting solution, and flaking the melt. Hydrated double salt : 5Ca$(NO_3)_2 \cdot NH_4NO_3 \cdot 10H_2O$ is water soluble calcium ammonium nitrate and is a mixture of calcium nitrate and ammonium nitrate. Calcium is estimated complexometrically with EDTA by using murexide as an indicator.

- **Chemicals required :** 0.02 M $Na_2(H_2EDTA)$ Sodium hydroxide, calcium ammonium nitrate, Conc. HCl.

- **Chemical reaction :**

$$Ca^{2+} + (H_2EDTA)^{2-} \longrightarrow (CaEDTA)^{2-} + 2H^+$$

- **Indicator :** murexide (freshly prepared)
- **End point :** Red to violet colour

- **Procedure :**

→ Prepare 250ml of 0.02M $Na_2(H_2EDTA)$ solution by dissolving 1.86g $Na_2(H_2EDTA)$ in 250ml of water.

→ Rinse and fill the burette with 0.02M $Na_2(H_2EDTA)$ solution.

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→ Dissolve 2g of the given sample of calcium ammonium nitrate in water, filter, if solution is not clear add a few drops of concentrated HCl, raise the volume to 250 ml

→ Pipette out 10ml of solution prepared in step 3 into a titration flask and add NaOH solution to obtain a solution of pH about 12.

→ Add 2-3 drops of freshly prepared 1% aqueous of murexide indicator to the solution prepared in step 4.

→ Note the initial reading of burette

→ Add EDTA solution from the burette to the solution obtained in step 5 till the colour changes from red to violet.

→ Note the final reading of burette.

→ Repeat the experiment to get concordant reading

observation and calculations:

volume of solution (Ca^{2+} ions) taken for each titration = 10ml

Molarity of EDTA = 0.02 M

- Calculations :

Applying molarity equation, one mole of EDTA combines with one mole of Ca^{2+} ions.

$$M_1V_1 = M_2V_2$$
Ca^{2+} solⁿ EDTA

Molarity of Ca^{2+} solution $= M_1 = \frac{M_2}{V_1} V_2$

$$M_1 = \frac{M}{50} \times \frac{V}{10}$$

Strength of calcium in given sample $= \frac{M}{50} \times \frac{V}{10} \times 40 g/l$

- Result: Amount of calcium present in 2g of calcium ammonium sulphate

- Precautions :

→ The molarity of EDTA solution must be 0.02.
→ Apparatus used must be neat and clean.
→ freshly prepared 1% aqueous solution of indicator murexide must be used
→ 2g of fertilizer must be dissolved in 250 ml of solution

NAME : SHEENA KOUR

ROLL : 468

CLASS : BSC Non-Med(Evn)

SUBJECT : Chemistry Project.

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Q What are fertilizers? Discuss their classification and Uses. How to determine the free acidity in Ammonium Sulphate fertilizers.

A Fertilizer is any material of natural or Synthetic origin that is applied to soil or to plant tissues to supply plant nutrients. Fertilizers may be distinct from liming materials or other non-nutrient soil amendments. Many Sources of fertilizer exist, both natural and industrially produced. For most modern agricultural process (practices), fertilization focuses on three main macro nutrients Nitrogen (N) Phosphorous (P) and Potassium (K) with occasional addition of Supplements like rock dust for micronutrients. Farmers apply these fertilizers in a Variety of ways through dry or pelletized or liquid application processes using large agricultural equipments or hand-tool methods.

Historically fertilization came from natural or organic Sources:

compost, animal manure, human manure, harvested minerals, crop rotation and byproducts of human-nature industries. However starting in the 19th century, after innovation in plant nutrition, agricultural industry developed around synthetically created fertilizer. This transition was important in transforming the global food system allowing for large scale industrial agricultural with large crop yield.

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Synthetic fertilizer in agriculture has wide reaching environmental consequences. According to the Intergovernment Panel on Climate change (IPCC) Special Report on climate and Land, production of these fertilizer and associated land use practices are key drivers of global warming. The use of fertilizers has also led to a number of direct environmental consequences agricultural runoff which leads to downstream effects like ocean dead zones and water waterways contamination, soil microbiome degradation, and

accumulation of toxins in ecosystem.
Indirect environmental impact include the environmental impacts of fracking for natural gas used in the Haber process, the agricultural boom is partially responsible for the rapid growth in human population and large-scale industrial agricultural practices are associated with habitat destruction, pressure on biodiversity and agriculture soil loss.

Fertilizers are food for plants; they provide the essential nutrients that they need to grow and thrive. Fertilizers are used across the globe to support sustainable agricultural production, and it is estimated that half the food we eat is produced thanks to mineral fertilizers.

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CLASSIFICATION OF FERTILIZERS

The fertilizers are classified on the basis of nature of nutrients elements like Nitrogen, Phosphorous, Potassium (NPK) Present chemically in the compounds. There are various nitrogen chemical fertilizers like ammonium sulphate, Calcium ammonium nitrate, basic calcium nitrate, Calcium Cyanamide (nitrolium), urea etc. Obviously these fertilizers supply nitrogen to the soil. Similarly there are various Phosphatic chemical fertilizers like Super phosphate of lime, triple super phosphate etc and potash chemical fertilizers like ammonium sulphate, Potassium chloride, potassium nitrate, potassium Sulphate etc. Thus phosphatic and potash chemical fertilizers supply phosphorus and potassium to the soil respectively. There are also some chemical fertilizers of different composition like that of nitrogen phosphorous (NP) fertilizers in which nitrogenous fertilizers and phosphatic fertilizers are mixed up into definite and proper ratio. The fertilizers like dehydrogenate ammoniated phosphate Calcium Super phosphate etc are N fertilizers are composed to supply nitrogen phosphorous and potassium all simultaneously to the soil

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Straight fertilizers:- Straight fertilizers are those which supply one primary plant nutrient, namely nitrogen or phosphorous or potassium eg Urea, ammonium sulphate potassium chloride and potassium sulphate

2 Complex fertilizers:- Complex fertilizers are in three primary plant nutrient of which two primary nutrients are in chemical combination. The fertilizers are usually produced in granular form e.g Diammonium phosphate, nitrophosphate and ammonium phosphate

3. Mixed fertilizers:- Mixed fertilizers are physical primary plant mixed fertilizers are made by thoroughly mixing the ingredients either mechanically or manually

Fertilizers can also be classified based on physical form.

1 Solid fertilizers.
2 Liquid fertilizers.

USES :-

Fertilizers are used for various purposes The uses of fertilizers are mentioned below:

- They are used to providing additional nutrients to the plants.
- They are added to improve the yield of the crops.
- Nitrogen rich fertilizers are used for the greening of lawns.
- Organic fertilizers improve the texture and fertility of the soil.
- Gardeners use fertilizers to address certain needs of the plants such as nutritional seeds.
- Fertilizers are added to potted plants to replace the lost nutrients.

- They are used for providing additional nutrients to the plants.
- They are added to improve the yield of the crops.
- Nitrogen-rich fertilizers are used for the greening of lawns.
- Organic fertilizers improve the texture and fertility of the soil.

In current horticulture practice, potential acidity or basicity of fertilizers is estimated using Pierre's Method (PM) expressed in Calcium Carbonate equivalents (CCE) per unit weight of fertilizer. PM was developed using mineral field soil systems and may be inaccurate for quantifying fertilizer acidity in containerized plant production given the widespread use of soilless substrates fertigation. The PM-predicted acidity of ammonium based fertilizer was compared against experimental data obtained when 'Ringo' geraniums and 'Super Elfin' impatiens grown in 70% and 30%.

Perlite limed with either hydrated limestone only(PH) or combination of carbonate and hydrated limestone

Fertilizer type and concentration, plant species, water alkalinity, substrate components and lime amendment dynamically effect substrate PH during plant production. Fertilizer effect on substrate PH during occur primarily through plant and microbial uptake of nutrients and subsequent release of ions and or root exudates such as nitrification.

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Pierce's method is the used in the U.S fertilizer industry to quantify the potential of a fertilizer to change soil acidity or alkalinity. The reported PH value for an acidic fertilizer in units of calcium carbonate equivalents (CCE) of acidity per unit weight of fertilizer refer to the CCE required to neutralize the acidity resulting from application of the fertilizer the. For basic reaction fertilizer, the (CCE) of basicity represents the basic residue in CCE left in the soil after application of fertilizer.

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SUBJECT - CHEMISTRY

CONCERNED TEACHER - Dr. RAVINDER

PROJECT - What are the characterstics of Battery. Discuss the working of Lead Acid Battery.

PROJECT - 1

What are the characteristics of Battery. Discuss the working of Lead acid Battery.

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INTRODUCTION TO BATTERY

A battery is a device that stores chemical energy and converts it to electrical energy. It is a source of electric power consisting of one or more electrochemical cells with external connections for powering electrical devices such as flashlights, mobile phones, and electric cars. When a battery is supplying electric power, its positive terminal is the cathode and its negative terminal is anode. The terminal marked negative is the source of electrons that will flow through an external electric circuit to the positive terminal. When a battery is connected to an external load, a redox reaction converts high-energy reactants to lower-energy products, and the free-energy difference is delivered to the external circuit as electrical energy.

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2

CHARACTERSTICS OF BATTERY

The following battery characterstics must be taken into consideration when selecting a battery:

1. TYPE

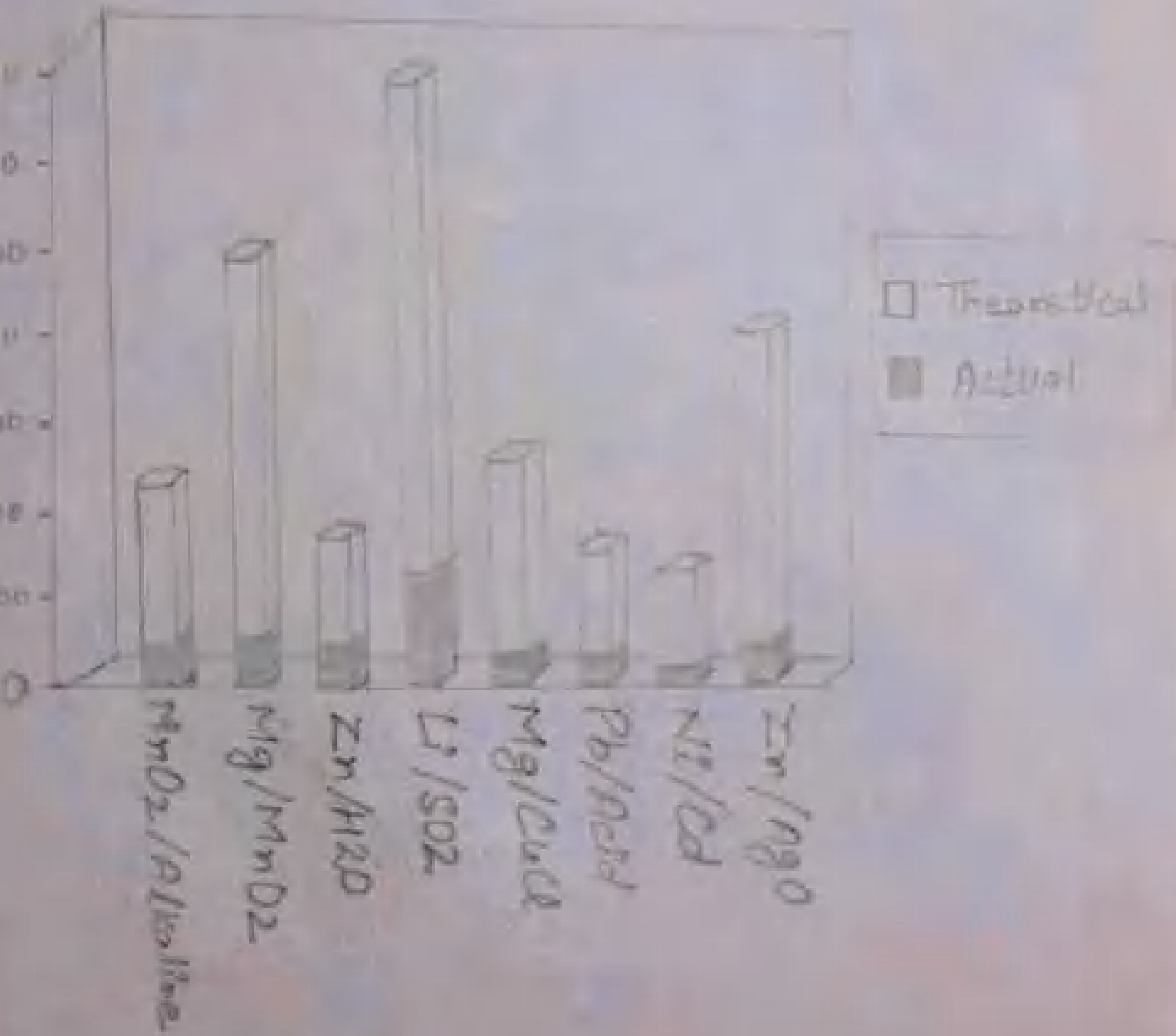
See Primary or Secondary battery to be used.

Primary batteries are either known as disposable or single-use battery and as their names suggest these can only be used once. So, Primary battery should be thrown away after use as they are non-rechargeable. Secondary batteries are however, so-called rechargeable bateries that can be discharged and recharged again and again. So, Secondary batteries can be reused and cannot be thrown after single use.

2. VOLTAGE

The theoretical standard cell voltage. The theoretical cell voltage is modified by the Nernst equation, which takes into account the component. The non-standard state of the reacting component. The Nernstian potential will change with time either because of use or self-discharge by which the

THEORETICAL AND ACTUAL CELL VOLTAGES OF A VARIETY OF CELL SYSTEMS



activity (or Concentration) of the electro-active component in the cell is modified. Thus, the nominal voltage is determined by the cell chemistry at any given point of time. The actual voltage produce will always be lower than the theoretical voltage due to Polarisation and the resistance losses (IR drop) of the battery and is dependent upon the load current and the internal Impedance of the cell. These factors are dependent upon electrode kinetic and thus vary with temprature, state of charge, and with the age of the cell. The actual voltage appearing at the terminal needs to be sufficient for the intended application.

Typical values of voltage range from 1.2 V for a Ni/cd battery to 3.7 V for a Li Ion battery.

The following graph shows the differences b/w the theoretical and actual voltages for the various battery systems.

3. DISCHARGE CURVE

The discharge curve is a plot of voltage against Percentage of capacity discharged. A flat discharge curve is desirable as this means that

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the voltage remains constant as the Battery is used up.

4. CAPACITY

The theoretical capacity of a battery is the quantity of electricity involved in the electro-chemical reaction. It is denoted Q and is given by:

$Q = xnF$

where x = number of moles of reaction,
n = number of electrons transferred per mole of reaction and
F = Faraday's constant.

The capacity is usually given in terms of mass, not the number of moles.

$$Q = \frac{nF}{M_r}$$

where M_r = Molecules Mass. This gives the capacity in units of Ampere-hours per gram (Ah/g).

In Practice, the full battery capacity could never be realised, as there is a significant weight contribution from non-reactive components such as binders and conducting Particles, separators and electrolytes and current collectors and substrates as well as Packaging

Typical values range from 0.26 Ah/g for Pb to 26.59 Ah/g for H_2.

5. ENERGY DENSITY

The energy density is the energy that can be derived per unit volume of the weight of the cell.

6. SPECIFIC ENERGY DENSITY

The specific energy density is the energy that can be derived per unit weight of the cell (or sometimes per unit weight of the active electrode material). It is the product of the specific capacity and the operating voltage in one full discharge cycle. Both the current and the voltage may vary within a discharge cycle and thus the specific energy derived is calculated by integrating the product of current and voltage over time.

7. POWER DENSITY

The Power density is the power that can be derived per unit weight of the cell (W/Kg)

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8. TEMPERATURE DEPENDENCE

The rate of the reaction in the cell will be temperature dependent according to theories of kinetics. The internal resistance also varies with temperature, low temperature give higher internal resistance, At very low temperature the electrolyte may freeze giving a lower voltage as ion movement is impeded. At very high temperature the chemicals may decompose, on there may decompose, on there may be enough energy available to activate unwanted, reversible reactions, reducing the capacity. The rate of decrease of voltage with increasing discharging will also be higher at lower temperature as will the capacity - thall is illustrated by the following graph.

9. PHYSICAL REQUIREMENT

This include the geometry of the cell, it's size, weight and shape and the location of the temperature.

10. CHARGE / DISCHARGE CYCLE

There are many aspects of the cycle that need consideration, such as

- Voltage neccessary to charge
- Time neccessary to charge
- Availability of charging source.

11. COST

This includes the initial cost of the battery itself as well as the cost of charging and maintaining the battery.

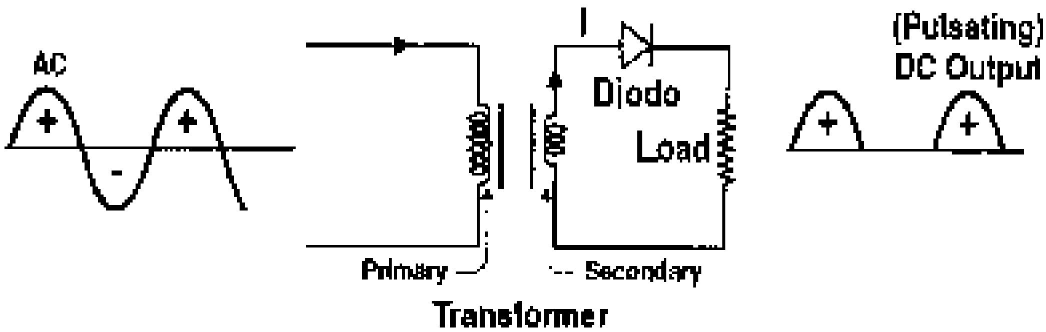
12. APPLICATION REQUIREMENT.

The battery must be sufficient for the intended application. This means that it must be able to produce the right current with the right voltage. It must have sufficient capacity, energy and power. It should also not exceed the requirement of the application by too much, since this is likely to result in unneccessary cost, it must give sufficient performance for the lowest possible price.

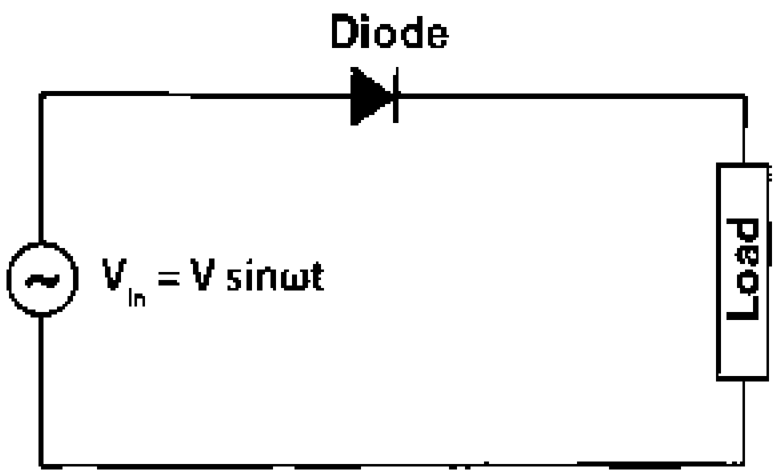
Working of Half Wave Rectifier

Let us understand how a half-wave rectifier transforms AC into DC.

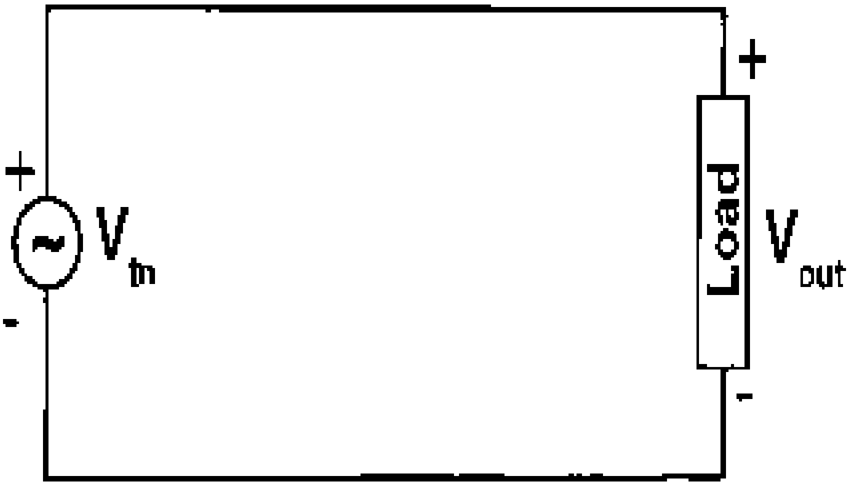
i. A high AC voltage is applied to the primary side of the step-down transformer. The obtained secondary low voltage is applied to the dioda.
ii. The diode is forward biased during the positive half cycte of the AC voltage and reverse biased during the negative half cycle.
iii. The final output voltage waveform is as shown in the figure below:



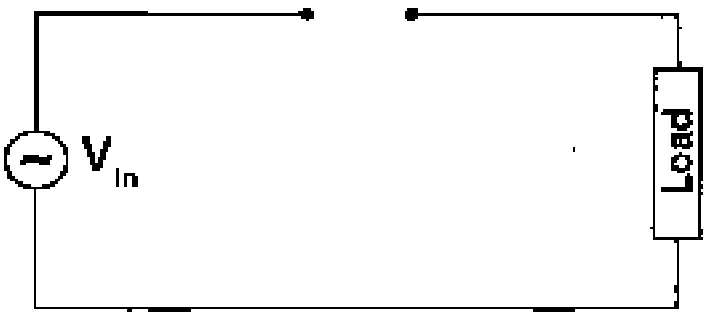
For better understanding, let us simplify the half-wave circuit by replacing the secondary transformer coils with a voltage source as shown below:



For the positive half cycle of the AC source voltage, tho circuit effectively becomes as shown below in the diagram



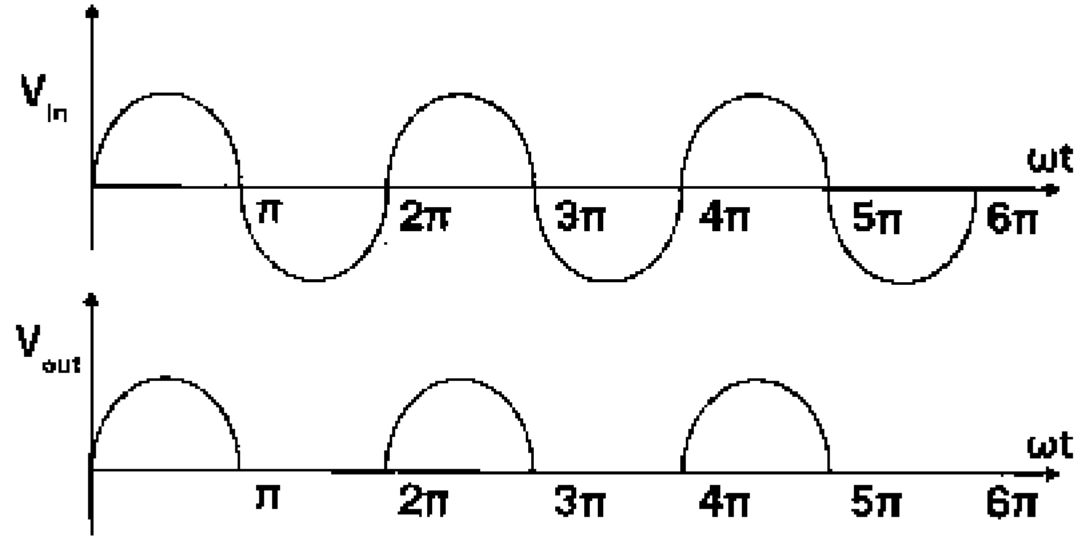
When the diode is forward biased, it acts as a closed switch. But, during the negative half cycle of the AC source voltage, the equivalent circuit becomes as shown in the figure below



When a diode is reverse biased, it acts as an open switch. Since no current can flow to the load, the output voltage is equal to zero.

Half Wave Rectifier Waveform

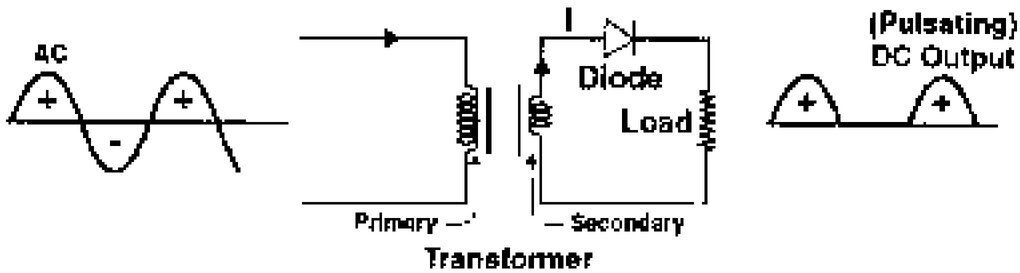
The half wavs rectifier waveform before and after rectification is shown bolow in the figure



Half Wave Rectifier Capacitor Filter

The output waveform of a helf wave rectifier is a pulsating DC waveform. Filters in half wave rectifiers ars used to transform the pulsating waveform into constant DC waveforms. A capacitor or an inductor can be used as a filter.

The circuit diagram bolow shows how a capacitive filter is used with half wave rectifier te smoothen out a pulsating DC waveform



into a constant DC waveform.

Half Wave Rectifier Formula

Ripple Factor of Half Wave Rectifier

Rippte factor determines how weil a half wave rectifier can convert AC voltage to DC voltage.

Rippie factor can be quantified using the following formula:

$$\gamma = \sqrt{\left(\frac{Vrms}{V_{dc}}\right)^2 - 1}$$

The ripple factor of a half wave rectifier is 1.21.

Efficiency of Half wave rectifier

The afficiency of a half wave rectifier is the ratio of output DC power to the input AC power.

Tha efficienoy formula for half wave rectifier is given as follows;

$$\eta = \frac{P_{DC}}{P_{AC}}$$

RMS value of Half Wave Rectifier

The RMS value of the load current for a half-wave rectifier is given by the formula:

$$I_{rms} = \frac{I_m}{2}$$

Form factor of a Half wave Rectifier

The form factor is the ratio batween RMS value and average value and is given by the formula:

$$\text{Form Factor} = \frac{\text{RMS value}}{\text{Average Value}}$$

Applications of Half Wave Rectifier

Here are a few common applications of half weve rectifiers:

- They are used for signal demedulation purpose
- They are used for rectification applications
- They are used for signal peak applications

Advantages of half-wave rectifier:

- Half wave rectifier is a simpla circuit.
- It has a tow cost.
- We can easy to use it.
- We can easily construct.
- It has a tow number of compononť, therefore it is cheap.

Disadvantages of Half Wave Reetifier

- Power toss
- Low output vottage
- The output contains a tet of ripptes.

Govt. College for Women Parade Ground, Jammu
(Autonomous College)

Department of Physics

Title of the Project: Study of full wave rectifier

Academic Session: 2020-2021

Class/Semester: B.Sc. Semester – V

Project Submitted by:

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2	Bhanu Priya	437
3	Gatha Sharma	368

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Project Report Full Wave Rectifier

- **Aim**
- **Introduction**
- **Working Theory of full wave rectifier**
- **Output waveforms**
- **Full-wave Rectifier with Smoothing Capacitor**
- **Material required**
- **Circuit Diagram**
- **Characteristics of full wave rectifier**
  - Ripple Factor
  - Form Factor
  - DC Output Current
  - Peak Inverse Voltage(PIV)
  - DC Output Veltage
  - Rectifier efficiency
- **Advantages**
- **Disadvantages**
- **Applications**

AIM:

. To construct a full wave rectifier and show that that Alternating Current is rectified into a Direct Current

Introduction:

The process of converting the AC current into DC current is called rectification.

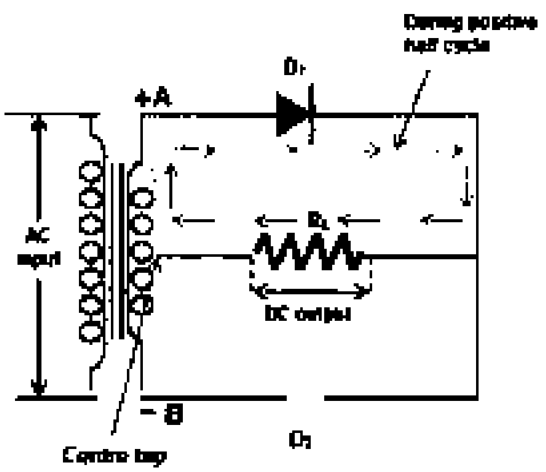
A full wave rectifier is a type of rectifier which converts both half cycles of the AC signal into pulsating DC signal

Working Theory of full wave rectifier:

The centre tapped full wave rectifier uses a centre tapped transformer to convert the input AC voltage into output DC voltage.

When input AC voltage is applied, the secondary winding of the centre tapped transformer divides this input AC voltage into two parts: positive and negative.

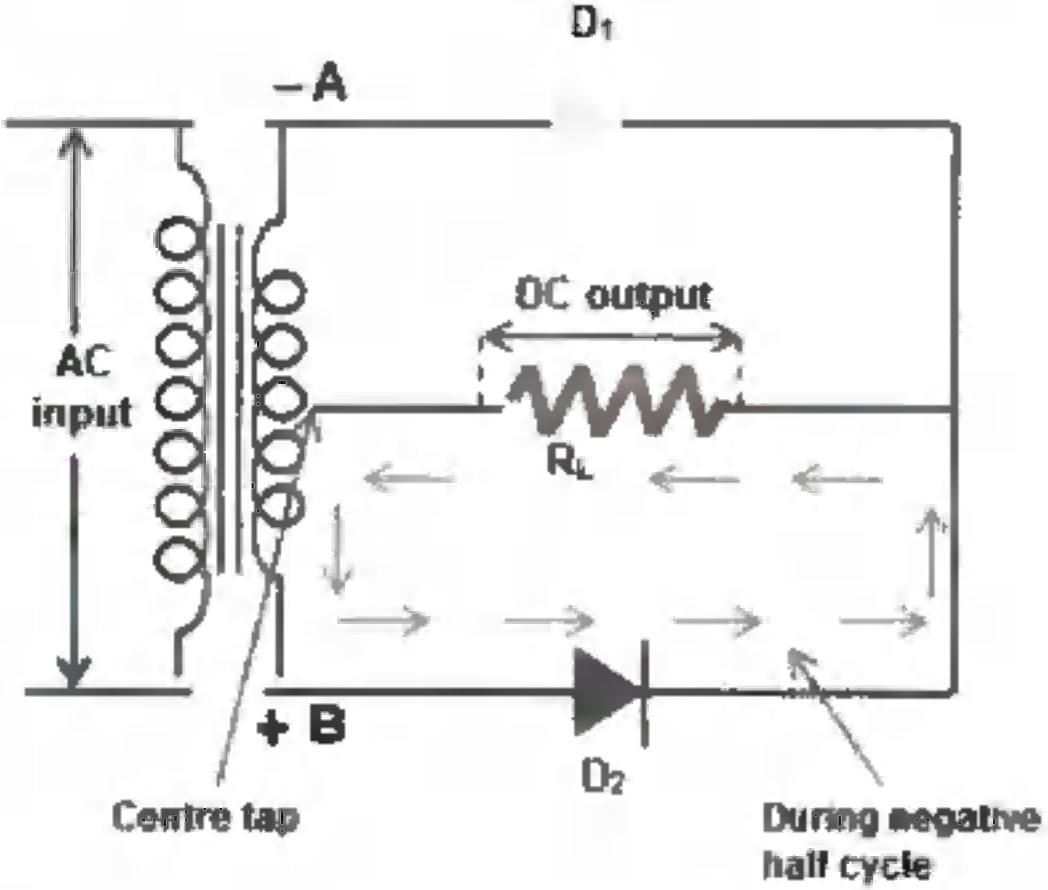
During the positive half cycle of the input AC signal, terminal **A** become positive, terminal **B** become negative and centre tap is grounded . The positive terminal A is connected to the p-side of the diode D1 and the negative terminal B is connected to the n-side of the diode D1. So the diode D1 is forward biased during the positive half cycle and allows electric current through it.



On the cther hand, the negative terminal B is connected to the p-side of the diode D2 and the positive terminal A is connected to the n-side of the diode D2. So the diode D2 is reverse biased during the pcsitive half cycle and dees not allow electric current through it.

The diode D1 supplies DC current to the load RL. The DC current produced at the load RL will return tc the secondary winding through a centre tap.

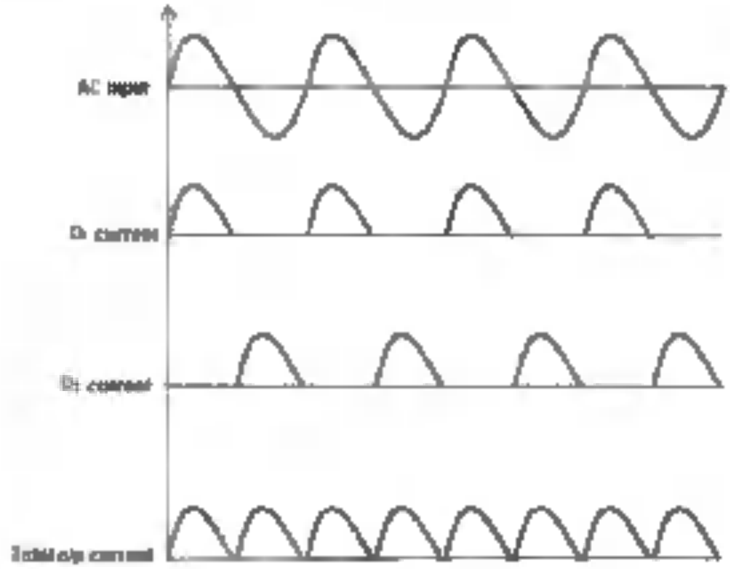
During the negative half cycle, current fiows only in the lower part of the circuit wbile the upper part of tbe circuit carry no current to the load because the diode D1 is reverse biased. Thus, during the negative half cycle of the input AC signal, only diode D2 allows electric current while diode D1 does not allow electric current.



Thus, the diode D1 allows electric current during the positive half cycle end diode D2 allows electric current during the negative half cycle of the input AC signal. As a result, both half cycles (positive and negative) of the input AC signal are allowed. So the output DC voitage is almost equai to the input AC vcitage.

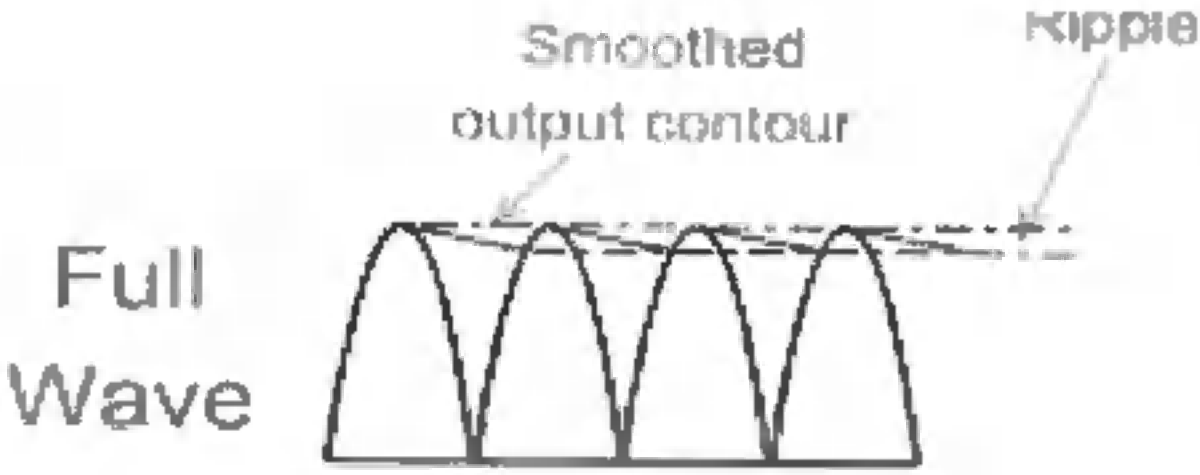
Output waveforms:

The first waveform represents an input AC signal. The second waveform and third waveform represents the DC signals or DC current produced by diode D1 and diode D2. The last waveform represents the total output DC curreht produced by diodes D1and D2.



Full-wave Rectifier with Smoothing Capacitor

The smoothing capaciter converts the full-wave **rippled** output of the rectifier into a more smooth DC output vottage.



Advantages

- High rectifier efficiency
- Low power loss
- Low npples

Material required:

Centre tapped transformer: When an additional wire is connected across the exact middle of the secondary winding of a transformer, it is known as a centre tapped transformer.

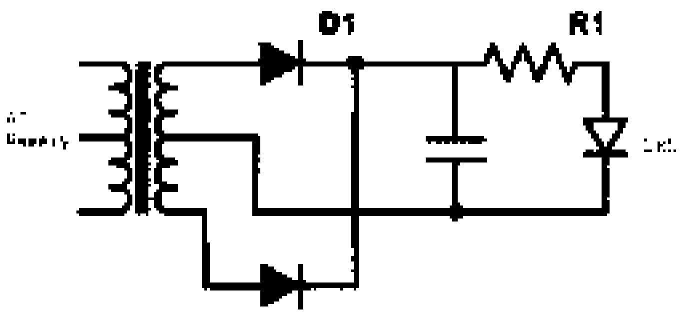
Diode: A diode is an electronic component with two electrodes. It allows electricity to go through it ohly in one direction.

Resistor: The rosistor is a passive electrical component to creato resistance in the flow of electric current.

LED: An LED produces light when electricity flows through.

Soldedng tron: To solder the various components used in this project.

Capacitor: A capacitor is a two-terminal, electrical component. Along with resistors and inductors, they are one of the most fundamental passive components we uso.



Circuit Diagram

Centre tapped full wave rectifier

Characteristics of Full Wave Rectifier

The characteristics of a full-wave rectifier are discussed below.

- Ripple Factor
- Form Factor
- DC Output Current
- Peak Inverse Voltage
- Root Mean Square Value of Load Current IRMS
- Rectifier Efficiency

Ripple Factor:

The ripple factor can be defined as the ratio of ripple voltage and the pure DC voltage. The main function of this is to measure the existing ripples within the o/p DC signal, so based on the ripple factor, the DC signal can be indicated. When the ripple factor is high then it indicates a high pulsating DC signal. Similarly, when the ripple factor is low then it indicates a low pulsating DC signal.

$$\gamma = \sqrt{(\mathbf{Vrms}/V_{dc})^2 - 1}$$

Where, γ = 0.48.

Form Factor

The form factor of the full-wave rectifier can be defined as the ratio of RMS value of current and DC output current.

Form Factor = RMS Value of Current /DC Output Current.
For a full-wave rectifier, the form factor is 1.11

DC Output Current

The flow of current in both the diodes like D1 & D2 at the o/p load resistor like RL is in the same direction. So, the o/p current is the amount of the current in both the diodes

The current generated through the D1 diode is Imax/π.

Tho current generated through the D2 diode is Imax/π.

So, the o/p current ($\mathbf{I_{DC}}$) = $\mathbf{2Imax/\pi}$.

Where.

'Imax' is the max DC load current

Peak Inverse Voltage (PIV)

Peak inverse voltage or PIV is also known as peak reverse voltage. It can be defined as when a diode can withstand maximum voltage within the reverse bias state. If the applied voltage is higher es compared with the PIV, then the diode will destroy permanently.

$$PIV = 2V_{S\,max}$$

DC Output Voltage

The DC o/p voltage can appear at the load resistor (RL) and that can be given like $V_{DC} = 2V_{max}/\pi$.
Where,

"V_{max}" is the max secondary voltage.

I_{RMS}
The root mean square value of the load current of a full-wave rectifier is

$$I_{RMS} = I_m\sqrt{2}$$

V_{RMS}
Root mean square value of the o/p load voltage of a full-wave rectifier is

$$V_{RMS} = I_{RMS} \times R_L = I_m/\sqrt{2} \times R_L$$

Rectifier Efficiency

The efficiency of the rectifier can be defined as the fraction of DC o/p power & the AC i/p power. Rectifier efficiency indicates how efficiently converts AC into DC. When the rectifier efficiency is high then it is called a good rectifier whereas the efficiency is low then it is called an inefficient rectifier.

$$H = Output(P_{DC})/Input(P_{AC})$$

For this rectifier, the efficiency is 81.2% and it is double as compared with a half-wave rectifier.

Advantages

The advantages of a full-wave rectifier include the following.

- The ripple frequency is two times tho input frequency.
- Efficiency is higher.
- The large DC power output.
- Ripple factor is less.
- The ripple voltage is low and the higher frequency in case full-wave rectifier so simple filtering circuit is required.
- Higher output voltage.
- Higher transformer utilization faotor.
- Utilizes both halves of the AC waveform.
- Easier to provide smoothing as a result of using the ripple frequency.

Disadvantages

- Moro complicated than half-wave rectifier.
- It requires more diodes, two for centre tap reetifier and four for bridge rectifier.
- PIV rating of tho diode is higher.
- Higher PIV diodes are larger in size and too much costlier,
- The cost of the centre tap transformer is high
- **Applications**
- Mobile phones, laptops, charger circuits.
- Uninterruptible Power Supply (UPS) circuits to convert AC to DC.
- Our home inverters convert AC to DC.
- LCD, LED TVs.
- Car Alternator to charge the batteries during the running of the car

Govt. College for Women Parade Ground, Jammu
(Autonomous College)

Department of Physics

Title of the Project: To determine the value of e/m of electron by Solenoid (Helical) method

Academic Session: 2020-2021

Class/Semester: B.Sc. Semester – VI

Project Submitted by:

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INDEX

- OBJECT
- APPARATUS
- INTRODUCTION
- THEORY
- PROCEDURE
- CALCULATION
- OBSERVATION
- PRECAUTIONS

OBJECT: To determine the value of e/m of an electron by Helical method.

APPARATUS: The apparatus for determination of e/m comprises of three parts

1. A cathode ray tube
2. A powet snpply unit
3. A long closely wound solenoid in which the cathode ray tube can be placed so that the axis cathode ray and that of the solenoid coincied.

   The cathode ray tube is conneeted to tbe power supply nnit through a cable .The cable encloses the leads originating from the filament ,grid , accelerating anodes and deflecting plates. The ends of the leads are connected internally to points in the power supply unit .

The front panel of power supply unit is shown in flg 36.2

.When the ON- OFF switch is put in the on position the snpply is nn and the filament of the cathode ray tube get suitable heating.The cathode then start emitting electron's. Accelerating voltage can be applied to the accelerating anode by adjusting the accelerating voltage controls . Separate controls are provided for coarse and fine adjustment.The value of accelerating voltage ean be measured by the accelerating voltage (D.C) voltmeter .The beam can be focused with the FOCUS control and it's brightness adjusted with the INTENSITY control

When a sharp bright point focus is obtained in the middle of tho screen the DEFLECTING VOLTAGE SWITCH is turned to be X- plate with the help of X- voltage eontrol regulator the A.C voltage applied to X-plate is adjusted to obtain a line 2-3cm long

Similarly the y- deflection switch and control can be used .The value of AC voltage is measured by the A.C voltmeter .

To apply the magnetic field the cathode ray tube is placed axially in the suitable position within the long closely wound solenoid and the solenoid is connected to the power supply unit between the two terminals marked SOLENOID.The solenoid current can be adjusted from low to high valne with a regulating control.The ean also be reverse with a switch marked REVERSE. The value of current is read with the D.C of ammeter .

INTRODUCTION

E/M of an electron by Helical solenoid method:

In the Helical method, a cathode ray tube is inserted in a solenoid and e/m determined from the condition for focusing defected electrons to a spot in the screen.

This has been modified by substituting alternating current in the solenoid and simultaneously supplying a voltage to the deflection plate proportional to the solenoid current us a result all electrons moving spiral of the same radius and the pattern observed is portion of a circle(provided the beam has been properly centered) . By adjusting the solenoid current until a full circle just appeared e/m may be deduced. The result obtained were consistant with those of the method using direct current, but were 6to9% low. The discrepancy was traced to using the distance from the screen to the near of the deflection plate in the e/m formulae, whereas an analysis showed it should be measured to the centre of the plates, e/m we also produced from the magnitude of radius of the displayed circle.

➢ Why do we calculate e/m ratio?

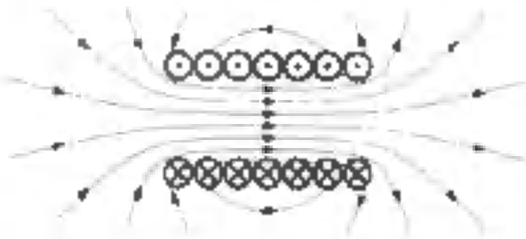
The measuring of e/m ratio of an electron was very important so that physics could gain a better understanding of this particle. In the beginning of 1900 it allowed scientists to gain a better understanding of this newly discovered particle. The experiment uses equations from circular motion and forces on electrons in magnetic field which is a part of AS physics syllabus as well as being in a turning points in a physics module.The experiment needs a fully darkened space. A teacher must be present at all times during this experiment due to high voltages to the electron gain in the fine beam tube.

In the E/M ratio e=magnitude of the charge of an electron in columbs and m=mass of en electron in Kg.

This ratio was first measured by J.J Thomson in 1897.

SOLENOID

An illustration of a solenoid



A solenoid is a type of electromagnet formed by a Helical coil of wire whose length is substantially greater than its diameter, which generates a controlled magnetic field. The coil can produce a uniform magnetic field in a volume of space when an electric current is passed through it. The term solenoid was coined in 1832 by Andre-Marie Ampere.

The Helical coil of a solenoid does not necessarily need to revolve around a straight line axis;for example, William Sturgeon's electromagnet of 1824 consisted of a solenoid bent into a horseshoe shape(not unlike an arc spring).

Solenoids provide magnetic focusing of electrons in vaccums,notably in television camera tubes such as vidicons and image orthicons. Electrons take Helical paths with in the magnetic field . These solenoids ,focus coils,surround nearly the whole length of the tube.In engineering ,the term "solenoid "refers not only to the electromagnet but to a actuator that converts electrical energy to mechanical energy.

POTENTIOMETER:

A potentiometer is a three –terminal resistor with a sliding or rotating contact that forms an adjustable voltage divider. If only two terminals are used, one end and the wiper, it acts as a variable resistor or rheostat.

The measuring instrument called a potentiometer is essentially a voltage divider used for measuring electric potential(voltage); the component is an implementation of the same principle, hence its name.

Potentiometers are commonly used to control electrical devices such as volume controls on audio equipments. Potentiometer operated by a mechanism can be used as a position transducers, for eg, in a joystick. Potentiometer are rarely used to directly control significant power (more than a watt). Since the power is dissipated in the potentiometer would be comparable to the power in the controlled load.

CATHODE RAY TUBE:

A cathode- ray tube (CRT) is a vacuum tube containing one or more electrons guns, which emit electron beams that are manipulated to displayed images on a phosphorescent screen.

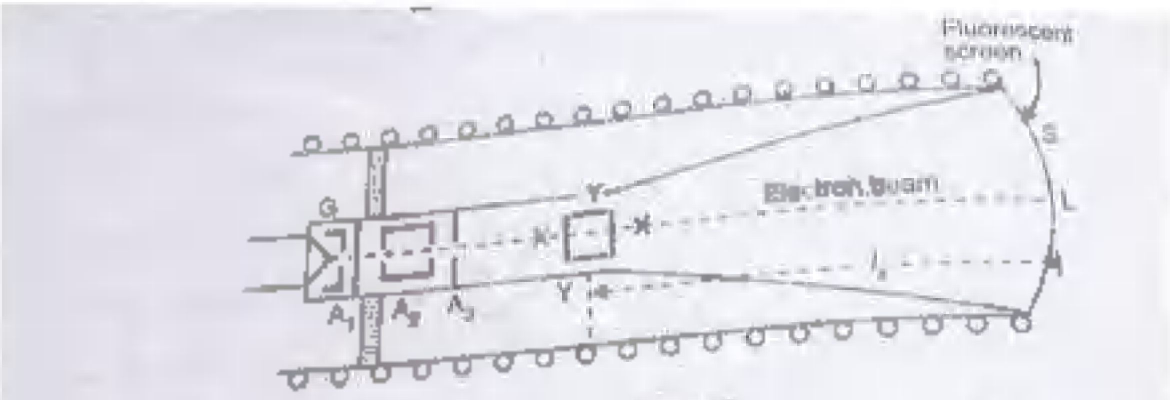


Fig. 36.3

The images may represent electrical wave forms(oscillescope), pictures(television set, computer monitor), radar targets, or other phenomena. A CRT on a television is commonly called a picture tube. CRTs have also been used as memory devices, in which case the screen is not be intended to be visible to an observer. The term cathode ray was used to describe electron beams when they were discovered before it was understood that what was emitted from the cathode ray was a beam of electrons.

E/M of an electron: E/M of an electron is the ratio of the charge on an electron to its rest mass . It is also known as specific charge. The value of e/m $=1.76\times10^{11}$ Coul/kg.

$= 1.76 \times 10^7$ e.m.u/gm $\qquad = 5.28 \times 10^{17}$ e.s.u/gm

THEORY

DETERMINATION OF e/m:

The value of e/m for an electron can be determined by Busch method or Helical method or long solenoid method by making use of a cathode ray tube. The electrons emitted by the cathode and collimated by the grid or accelerated by applying a suitable positive potential to the anode system. These are brought to a sharp point focus at the centre of the screen.

If V_0 is the accelerating voltage, then the velocity V acquired by the electrons is given by

$$\frac{1}{2}mv^2 = eV_0$$

$$\text{Or } v = \sqrt{\frac{2eV_0}{m}}$$

If l is the distance between the centre of the deflecting plate of the cathode ray tube and the centre of the screen, then

$$t = \frac{l}{v} = \frac{l}{\sqrt{\frac{2eV_0}{m}}}$$

In S.I unit l is in metres, m in kg, V_0 in volts and e in coulomb.

If an alternating current potential difference is applied either across the X or Y deflecting plates, then due to the alternating electric field, a force acts on the electron beam at right angles to the direction of the beam. Under the action of two perpendicular forces, one due to the accelerating voltage and the other due to the alternating potential difference, the electron beam has a parabolic path. The electrons along the parabolic path with increased transfer velocity as they pass through the deflecting plates after which they travel along straight line so that the beam on reaching the screen sweeps back and forth tracing out a straight line. This line is horizontal if the alternating potential difference applied across the X-plates and vertical if the potential difference is applied across the Y-plates. The length of the line depends upon the magnitude of the alternating potential difference.

Finally a megnetic field is applied with the help of a long closely wound solenoid in such a way that the lines of megnetic force are parallel to the axis of the cathode ray tube . this field, therefore,doesnot affect the forward motion of electron i.e. their longitudinal velocity but acts on the transverse motion and the electrons describe a circular path due to this transverse velocity. The resultant of the combined uniform circular and uniform linear metion is that the electrons travel along a helical path in the tube.

If B is the strength of the magnetic field and V' the transverse velocity of an electron , then the equilibrium equation is given by

$$B\,e\,v' = \frac{mv'^2}{r}$$

Where r is the radius of the circular path along which the path moves.

$$\therefore \frac{v'}{r} = \omega = B\frac{e}{m}$$

Now $\frac{v'}{r} = \omega$, the angular velocity depends upon B only and is constant for a given value of B.

$\therefore$ time period to describe the circle

$T = \frac{2\pi}{\omega} = \frac{2\pi m}{B\,e}$ ---(i)

The value of B is adjusted to make the time T of electron to go once around a circular path equal to the time t to travel forward a distance l from the centre of deflecting plates to the screen as given in relation (i). As this conditiou is independeut of transverse velocity, it holds true for all the electrons and therefore all the electrons again collect on the axis and focused at a tiny point on the screen i.e. the line again reducees to a point focus.

Such a condition may be obtained again for higher value of B when the time period $T = 1/2$ or $1/3$ etc of the time t.

Thus we may ohtained a number of foci by varying B if B_0 is the minimum value of B for which this condition is obtained, then

$$\frac{2\pi m}{B_0 e} = \frac{l}{\sqrt{2\frac{e}{m}V_0}}$$

$$\therefore \frac{e}{m} = \frac{8\pi^2 V_0}{B_0^2 l^2} \text{ — (ii)}$$

The magnetic field B_0 along the axis of a long closely wound solenoid In S.I. units (Tesla) is given hy

$$B_0 = \frac{\mu_0}{2}\frac{NI}{L}(\cos\theta_1 - \cos\theta_2)$$

Where θ_1 and θ_2 are the angles subtended at the ecutre by the extremities of the solenoid and

$$\mu_0 = 4\pi \times 10^{-7} \text{ Weher/Amp-metre}$$

N= Total nutnber of turns

I = Current in Amps.

L= Length of the solenoid in metre

When the centre of the solenoid coincides with the centre of deflecting plates

$$\theta_1 = \theta \text{ and } \theta_2 = \pi - \theta$$

$$\therefore \ \theta_0 = \frac{\mu_0 NI}{2L} 2\cos\theta = \frac{\mu_0 NI}{L}\cos\theta \text{ — (iii)}$$

If R is the radius of the soleuoid, and D its diameter then

$$\cos\theta = \frac{L/2}{\sqrt{R^2 + (\frac{L}{2})^2}} = \frac{L/2}{\sqrt{(\frac{D}{2})^2 + (\frac{L}{2})^2}} = \frac{L}{\sqrt{D^2 + L^2}}$$

Substituting the value of B_0 from (iii)in eq (ii) we have

$$\frac{e}{m} = \frac{V_0}{I^2} \cdot \frac{1}{2}\left[\frac{4\pi}{\mu_0} \frac{L}{NL\cos\theta}\right]^2$$

Substituting the value of $\mu o/4\pi = 10^{-7}$

$$\frac{e}{m} = \frac{V_0}{I^2}\left[\frac{L}{NI\cos\theta}\right]^2 \times 5 \times 10^{13}$$

$$= K\frac{V_0}{I^2}$$

Where K= $5 \times 10^{13} \frac{L}{NI\cos\theta}$

If lx is the distance from the centre of x-deflection plates to the screen and ly corresponding value for Y- plates ,then

For X-plates

$$K_X = 5 \times 10^{13}\left(\frac{L}{NI_x\cos\theta}\right)$$

And for y -plates

$$K_Y = 5 \times 10^{13}\left(\frac{L}{NI_y\cos\theta}\right)$$

PROCEDURE

1. Place the solenoid in the East-West direction so that the horizontal component of earth's magnetic field may exert a force at right angles to the direction of motion of the electrons and impart a circular path to them. Place the cathode ray tube centrally inside the solenoid so that the axis of the CRT into the power supply units in its socket . Connect the solenoid between the two terminals marked SOLENOID . switch on the power supply . apply a suitable accelerating voltage by adjusting the ACC. VOLT . CONT. obtain a bright point spot on the centre of the screen by adjusting accelerating voltage, focus , and intensity controls .
2. Put the DEFLECTING PLATE VOLTAGE switch to the X-plate position and adjust the X-VOLT CONT to apply a suitable A.C.to produce a horizontal line 2-3 cm long on the screen
3. Now switch on the current in the solenoid so as to produce a magnetic field along its axis . Adjust the value of the current till a point focus is again obtained on the screen. Note the value of the current . Also note the value of accelerating voltage . Reverse the current in the solenoid by the REVERSE switch and again adjust it's value , till a point focus is obtained .

4. Take a number of observations by changing the accelerating voltage and adjusting the solenoid current corresponding to each voltage.
5. Now put the DEFLECTING PLATE VOLTAGE SWITCH to the Y-plate position and adjust the Y-VOLT CONT to apply a suitable A.C.to produce a vertical line 2-3 cm long on the screen and again take a number of observations.

OBSERVATION ANDCALCULATIONS

Length of solenoid L = 0.45m

Mean effective diameter of solenoid = 2R = D=$10.5\times10.5^{-2}m$

Total no. Of turns in the solenoid N = 3000

Mean distance of the X- plates from the screen l_x = 100mm=0.1m

Meaa distance of the Y - plates from the screen l_y = 140mm=0.14m

[All of the above data for the solenoid and the CRT is generally provided by the manufacturers]

$$\text{Cos }\theta = \frac{L/2}{\sqrt{R^2+(\frac{L}{2})^2}} = \frac{L}{\sqrt{D^2+L^2}} = \frac{0.45}{\sqrt{(10.5\times10^{-2})^2+(0.45)^2}}$$

$$= \frac{0.45}{\sqrt{110.25\times10^{-4}+0.205}} = \frac{0.45}{0.462}$$

$$\boxed{\cos\theta = 0.974}$$

$$K_X = 5 \times 10^{13}\left(\frac{L}{Nl_x \cos\theta}\right)$$

$$K_X = 5 \times 10^{13}\left(\frac{0.45}{3000 \times 0.1 \times 0.974}\right)$$

$$K_X = 5 \times 10^{13}\left(\frac{0.45}{292.2}\right)$$

$$K_X = 5 \times 10^{13}(0.00154)$$

$$K_X = 0.0077 \times 10^{13}$$

$$\boxed{K_X = 0.77 \times 10^{11}}$$

$$K_Y = 5 \times 10^{13}\left(\frac{L}{Nl_y \cos\theta}\right)$$

$$K_y = 5 \times 10^{13}\left(\frac{0.45}{3000 \times 0.14 \times 0.974}\right)$$

$$K_y = 5 \times 10^{13}\left(\frac{0.45}{409.08}\right)$$

$$K_y = 0.0055 \times 10^{13}$$

$$\boxed{K_y = 0.55 \times 10^{11}}$$

OBSERVATION:

S. No	Accelerating voltage in volts(V_0)	Horizontal X-deflection current in amperes(I)	$\frac{V_0}{I_0^2}$	e/m = $K_x \frac{V_0}{I_0^2}$

		Forward	Reverse	Mean (I_0)	I_0^2		
1	600V	24×0.02=0.48A	25×0.02=0.5A	0.49	0.2401	2498.9	$0.77\times 10^{11}\times 2498.9 = 1924.1\times 10^{11}$
2	650V	27×0.02=0.54A	28×0.02=0.56A	0.55	0.3025	2148.76	$0.77\times 10^{11}\times 2148.7 = 1654.4\times 10^{11}$
3	670V	27×0.02=0.54A	28×0.02=0.56A	0.55	0.3025	2214.8	$0.77\times 10^{11}\times 2214.8 = 1705.3\times 10^{11}$

S. No	Accelerating voltage in volts(V_0)	Horizontal Y-deflection current in amperes(I)				$\frac{V_0}{I_0^2}$	$e/m = K_y \frac{V_0}{I_0^2}$
		Forward	Reverse	Mean	I_0^2		

				(I_0)			
1	**600V**	**14×0.02 =0.28A**	**14×0.02 =0.28A**	**0.28**	**0.078**	**7692.3**	**$0.55\times10^{11}\times7692.3$ $=4230.7\times10^{11}$**
2	**650V**	**15×0.02 =0.3A**	**15×0.02 =0.3A**	**0.3**	**0.09**	**7222.2**	**$0.55\times10^{11}\times7222.2$ $=3972.2\times10^{11}$**
3	**680V**	**15×0.02 =0.3A**	**15×0.02 =0.3A**	**0.3**	**0.09**	**7555.5**	**$0.55\times10^{11}\times7555.5$ $=4155.5\times10^{11}$**

Observed Mean e/m for vertical X-deflection =. 1761.3×10^{11} Conlomb/kg

Actual value of e/m $=1.758820\times10^{11}$ Coulomb/kg

Percentage error = $\dfrac{\text{Observed value - actual value}}{\text{Actual value}}\times100$

= 1661.3 %

Observed Mean e/m for vertical Y-deflection $=4119.5\times10^{11}$ Coulomb/kg

Actual value of e/m $=1.758820\times10^{11}$ Coulomb/kg

Percentage error = $\dfrac{\text{Observed value - actual value}}{\text{Actual value}}\times100$

= 1661.3 %

GRAPH:-

$=$ %

GRAPH:-

we can also calculate the mean value of $\frac{V_0}{I_0^2}$ by plotting a graph .To plot the graph take Accelerating voltageV_0 along X- axis and and square of current through solenoid i_0^2along Y- axis .Draw two separate graphs for X- deflection and Y- deflection currents .The graph is straight line as shown in the figure .Take two point A and C on the graph and draw a right angled triangle as shown then

Slope of the graph = AB/ BC $= I_0^2/V_0$

Therefore

$$BC/AC = \frac{V_0}{I_0^2}$$

Fig

Record (i) $\frac{V_0}{I_0^2}$ from X- deflection current graph. = BC/AB = e/m =

$K_x \frac{V_0}{I_0^2} =$ coul/kg(c kg^{-1})

$=$ coul/kg(c kg^{-1})

(ii) $\frac{V_0}{I_0^2}$ from y- deflection current graph. = BC/AB =

$$e/m = K_y \frac{V_0}{I_0^2} = \text{coul/kg}(c\,kg^{-1})$$

PRECAUTIONS:

The solenoid should be placed in the East-West direction .

The electron beam must be placed centrally inside the solenoid.

The electron beam must trace a line 2 to 3 cm long on the screen before the magnetic field is applied.

The line trace of electronic beam must be brought to a point focus by applying the magnetic field in one direction and then by reversing the current.

Reading must be taken by applying the electric field between X-plates as well as Y-plates.

Govt. College for Women Parade Ground, Jammu
(Autonomous College)

Department of Physics

Title of the Project: To determine the value of e/m of electron by Solenoid (Helical) method

Academic Session: 2020-2021

Class/Semester: B.Sc. Semester – VI

Project Submitted by:

S. No.	Name of Student	Roll No.
1	Manisha Mahajan	502
2	Avantika	521
3	Malvi Sharma	365

Teacher Incharge

Principal
Govt. College for Women
Parade, Jammu

HOD
Head of Department Physics (HOD)
G.C.W. Parade, Jammu

To determine the value of e/m for electron by Helical Method

Introduction

In the helical method a cathode-ray tube is inserted in a solenoid and e/m determined from the condition for focusing deflected electrons to a spot on the screen. This has been modified by substituting alternating current in the solenoid and simultaneously supplying a voltage to the deflection plates proportional to the solenoid current. As a result, all electrons move in spirals of the same radius and the pattern observed is a portion of a circle (provided the beam has been properly centered). By adjusting the solenoid current until a full circle just appears, e/m may be deduced. The results obtained were consistent with those of the method using direct current, but were 6 to 9% low. The discrepancy was traced to using the distance from the screen to the rear of the deflection plates in the e/m formula, whereas an analysis showed it should be measured to the center of the plates. e/m was also obtained from the magnitude of the radius of the displayed circle.

Helical Method

In a helical method ,cathode-ray tube is inserted in a solenoid and e/m determined from the condition for focusing deflected electrons to a spot on the screen.

e/m of an electron

e/m of an electron is the ratio of the charge on an electron to its rest mass. It is also known as specific charge.

The value of $e/m = 1.76\times10^{11}$ c/kg

1. { $e = 1.6\times10^{-19}$ coulomb ; $M = 9.1\times10^{-31}$ Kg

Formula used:

$$e/m = 5\times10^{13}\times L^2\times Va \;/\; N^2\, I^2\, l^2$$

Where L= length of the solenoid.

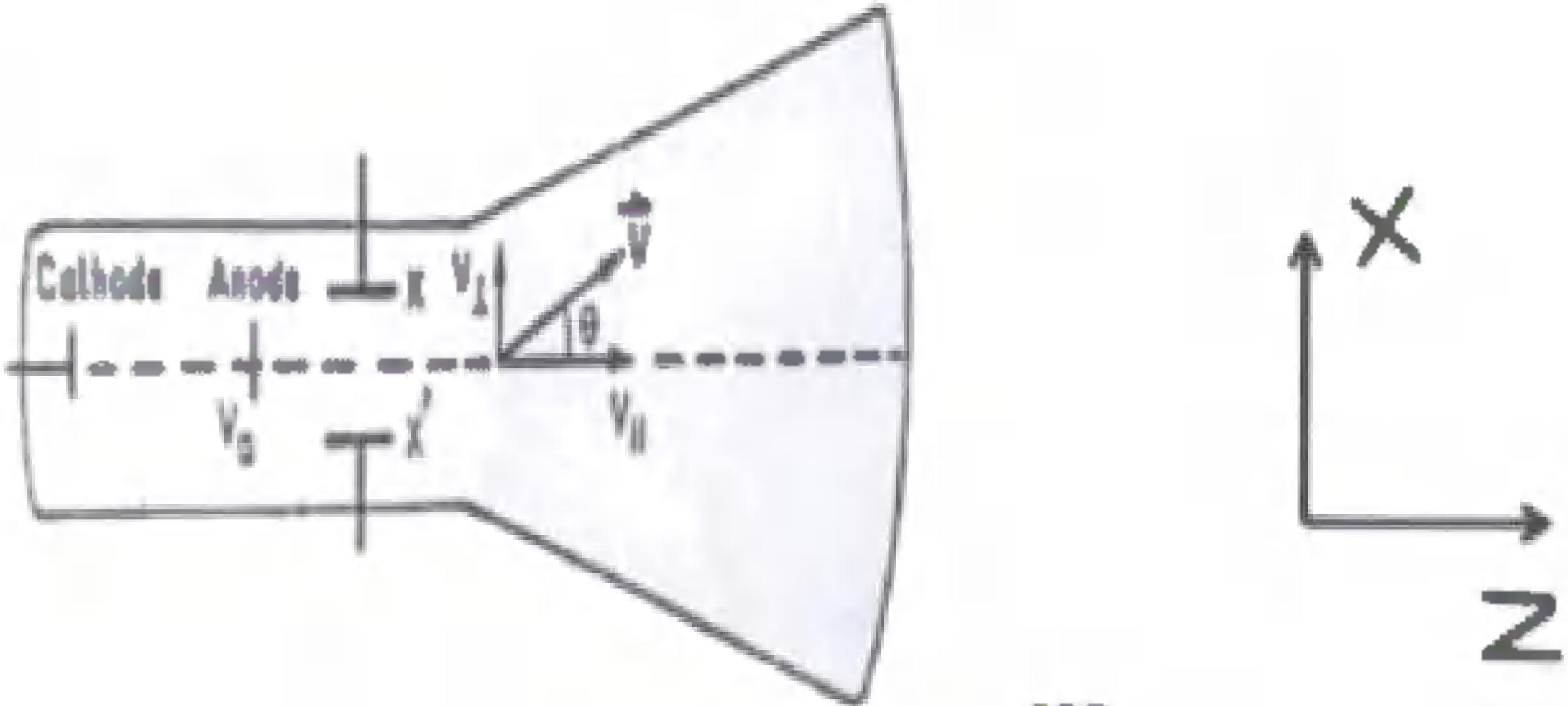
Va= Accelerating voltage.

l= Distance to screen from deflecting plates.

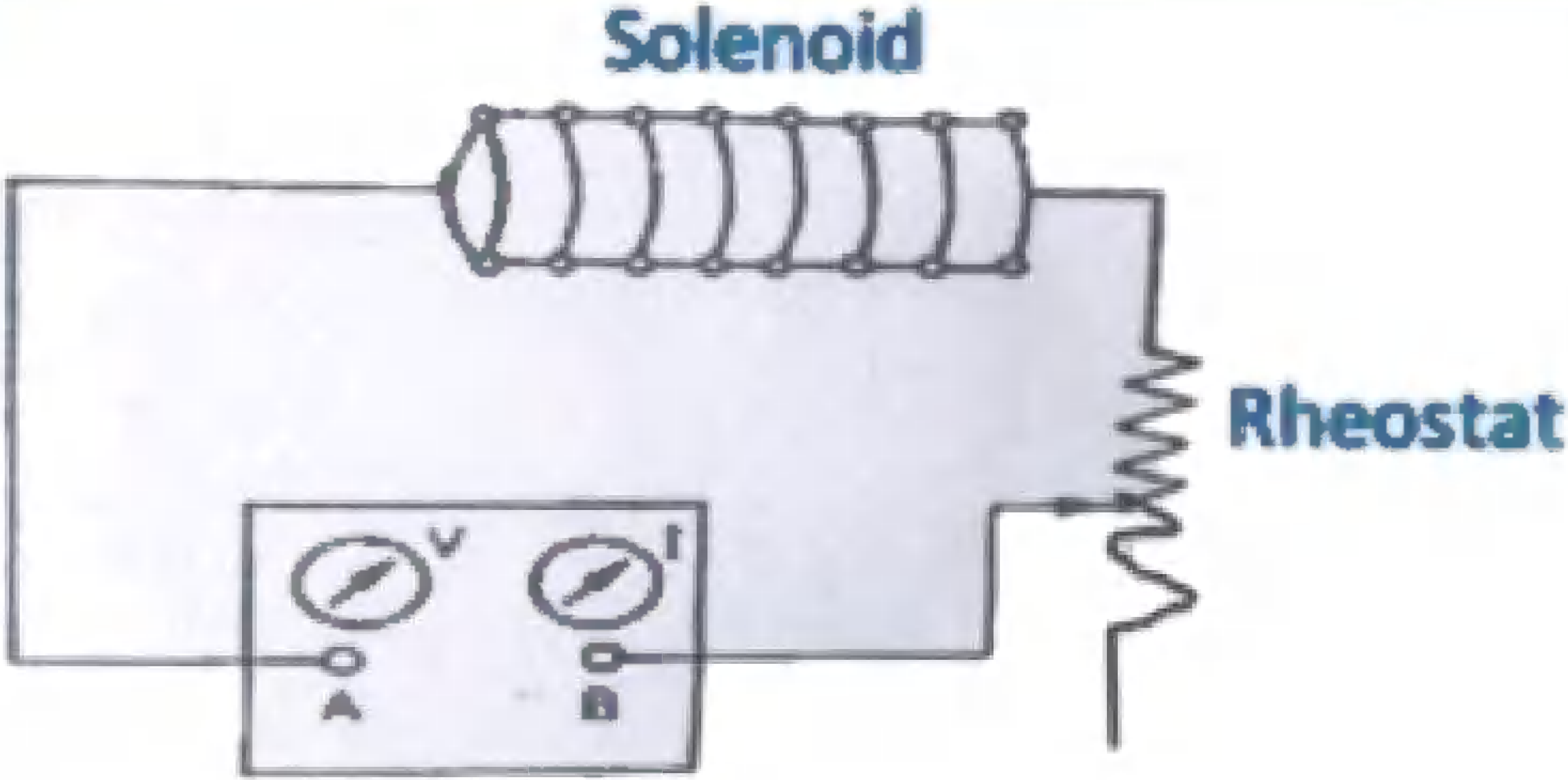
N=total number of turns of solenoid.

I= solenoid current.

Figure:



CRT



Solenoid
Rheostat
V
I
A
B

Procedure:

1.Place the solenoid in the East – West direction so that the horizontal component of earth's magnetic field may exert a force at right angles to the direction of motion of the electrons and impact a circular path of them. Place the cathode ray tube (CRT) centrally inside the solenoid so that the axis of the CRT and the solenoid coincide.plug the cable leading from the CRT into the power supply unit in its socket. Connect the solenoid between the two terminals marked SOLENOID. Switch on the power supply. Apply a suitable accelerating voltage by adjusting the ACC . VOLT .CONT . Obtain a bright point spot on the screen by

Calculation

Constants of the Cathode Ray Tubes:

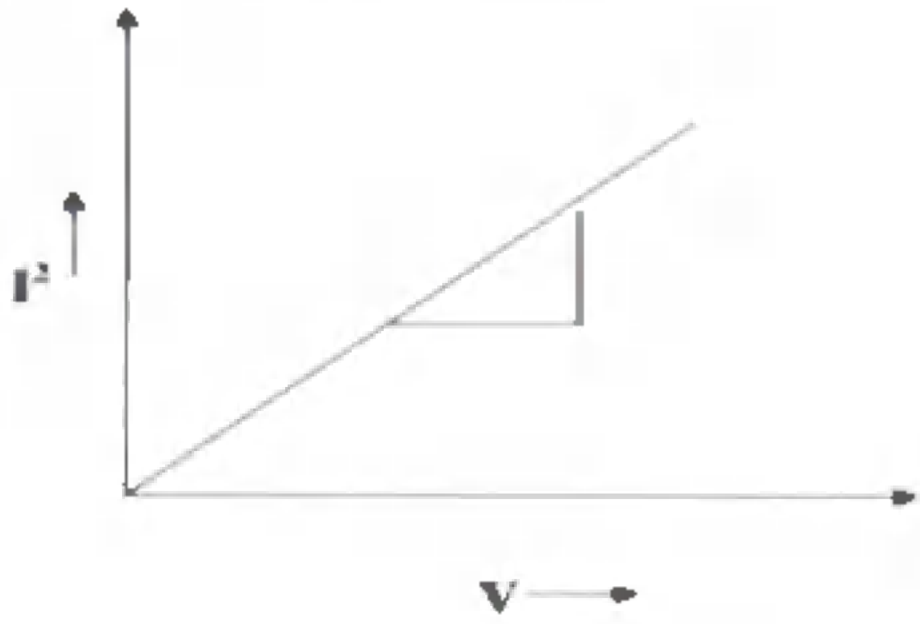
DESCRIPTION	CRT3BP1
(a) Separation between the plates (d)	10mm±1mm
(b) Length of plate (l)	25mm±1mm
(c) Distance of the screen from the edges Of the plates	130mm±1mm

OBSERVATION TABLE:

S.No.	Acceleration Voltage (V)	Current Measured			V/I (V/A)	e/m (C/kg)
		In I^{st} dir.	In II^{nd} dir.	Avg. Current		

Graph

Take V along X-axis and I^2 along Y axis. Take two points A and C and make a triangle ABC as shown in fig.



CALCULATIONS:

$$e/m = \frac{[\,5\times10^{7}\,(D^2+L^2)\,]V/I^2}{n^2 L^2 l^2}\ \text{e.m.u./gm}$$

Where

Length of the solenoid $L = 50$ cm

Number of turns per centimeter $N = n = 19$ Turns/cm

Diameter of the solenoid

$D = 3.5$ Inches $= 3.5 \times 2.54 = 8.9$ cm

Length of plates $(l) = 10$ mm

RESULT:-

Experimental value of e/m=……………

Standard value of e/m from the tables $= 1.758\times10^{7}$ e.m.u. /gm

% error =…………………

Precautions

1. The solenoid should be placed in East –West direction.
2. The cathode ray tube must be placed centrally inside the solenoid.
3. The electron beam must trace a line 2 to 3 cm long on the screen before the magnetic field is applied.

4. The line trace of the electronic beam must be brought to a point focus by applying the magnetic field in a point focus by applying the magnetic field in the one direction and then by reversing the current.

5. Reading must be taken by applying the electric field between X-plate as well as Y –plate.

Conclusion

This ratio is exactly same for all the electrons.

Since the typical change on atomic particles was known approximately at the time, the mass of the electron could be estimated and it turns out to be very tiny compared to the mass of the electron .

MAJESTY

Date: ____________ Page: ____________

Topic:

PROGECT FILE

DEPARTMENT OF BOTANY

Govt. College for Women Parade Ground, Jammu.

- NAME OF STUDENT:- SHAHEEN AKHTER
- [redacted] BSC
- [redacted] 3rd
- CLASS ROLL NO:- 259
- REGISTRATION NUMBER:- 20GCPA2438
- [redacted]

Principal
Govt. College for Women
Parade, Jammu

MAJESTY

Date : ______ Page : ______

Topic :

* TITLE OF THE PROJECT :- "PHYTOMORPHOLOGY".

[illegible]

- OUTLINE THE FUNCTION AND GROWTH OF STEMS.
- DESCRIBE THE STR AND FUNCTION OF THE LEAVES.
- DESCRIBE A GENERAL LEAF LIFE CYCLE.

* MATERIAL REQUIRED FOR PROJECT :- DIFFERENT VARIETIES OF LEAVES, THERMACOL, PEN, COLORS ETC.

* DESCRIPTION OF PROJECT :- LEAF SHAPE :- ANY OF THE VARIOUS SHAPE THAT LEAVES OF PLANTS CAN ASSUME LEAF FORM. FOLIAGE, LEAF, LEAFAGE - THE MAIN ORGAN OF PHOTOSYNTHESIS AND TRANSPIRATION IN HIGHER PLANTS.

LEAF IN BOTANY, ANY USUALLY FLATTENED GREEN OUTGROWT FROM THE STEM OF A VASCULAR PLANT. AS THE PRIMARY SITES OF PHOTOSYNTHESIS, LEAVES MANUFACTURE FOOD FOR PLANTS.

[illegible] LEAVES ARE USUALLY GREEN OR LIGHT GREEN IN COLOUR WITH DIFFERENT SHAPES AND SIZES.

[redacted]. AFTER RESEARCH ABOUT OTHER PROJECTS SIMILAR TO OURS. WE FOUND THAT AS THE LEAF GETS OLDER, THE PHOTOSYNTHETIC RATE WOULD DECLINE.

- PHOTOSYNTHESIS IS LIKE THE METABOLISM OF HUMANS. AS THEY GET OLDER, THEIR PHOTOSYNTHETIC RATES SLOWS DOWN. THIS HAS TO BE WITH THE STOMATA CONDUCTANCE OF THE PLANT. OLDER PLANTS HAVE A SMALLER RESPONSE TO ABA. THIS CAUSE THEM TO ACT MORE AS PROTECTORS TO THE FASTER, YOUNGER MORE ACTIVE LEAVES.

* PRECAUTIONS FOLLOWED:

- YOUNGEST FULLY EXPANDED LEAVES ARE FREQUENTY USED.

- IF MEASURING AT MIDDAY, MAKE SURE TO AVOID SHADED LEAVES.

Govt. College for Women, Parade Ground Jammu.

Minor Practical Project

- Name of the student Janvi Mangotra
- Academic Programme Pursing B.Sc Medical.
- Semester 2nd
- Class roll no. 145
- Registeration No. 21GCPA1145
- Teacher in charge of the practical Group

Prof. Tahira Firdous

Principal
Govt. College for Women
Parade, Jammu

H.O.D

Title of the Project - Cynobacteria

Objective of the Project:

The ability of Cyanobacteria to perform oxygenic photosynthesis is thought to have converted the early reducing atmosphere into an oxidizing one, which dramatically chang the compposition of the forms on Earth by stimulating bio-diversity and leading the near extinction of oxygen intolerant Organisms.

Material Required - Thermocoal, Colours, Cardboar

Introduction of Cyanobacteria:

Cynobacteria are aquatic and photosynthetic, that is they live in the water anc can manufacture their own food. Because they are bacteria, they are quite smal and usually unicellular, though they ofte grow in colonies large Enough to see More than 3·5 billion years old th Cyanobacteria are still around they ar one of the largest and most importa groups of Bacteria on Earth.

The other Great Contribution of the Cyanobacteria is the origin of plants

Govt. College for Women, Parade Ground, Jammu.

Minor Practical Project

* Name of the student Deepali Chandail
* Academic Programme Pursuing B.sc Medical
* Semester 2nd
* Class roll No. 106
* Registration No. 21GCPA1106
* Teacher in charge of the practical Group

Prof. Tahira Firdous

Principal
Govt. College for Women
Parade, Jammu

Classmate
Date:
Page:

1. Title of the Project :- TMV virus

2. Objectives of the Project :- The key objective of the Project work is to develop the analytical ability and to Jenny about the viral disease which affects all dicotyled many plants of which most important are tobacco and tomato.

3. Content involved :- Brief description of the project, Symptoms associated with TMV infections, How is TMV transmitted, How is TMV treated, Who discovered TMV virus.

4. Materials required for the project : Cardboard, Thermocol Paper, Colours, Rod.

5. Brief description of the Project

* Tobacco mosaic virus (TMV) is a plant virus that belongs to the genus Tobamovirus. It is named so because it majorly infects tobacco plants, potatoes, tomatoes and other members of the solanaceae family. The infection creates a mosaic like pattern, mottling and discoloration of the leaves.

Symptoms Associated with TMV infections:
Stunting
mosaic pattern of light and dark green (or yellow and green) on the leaves
malformation of leaves or growing points.

classmate
Date:
Page:

6 Observations :-

Tobacco mosaic virus causes a mottled browning of tobacco leaves, and accordingly is of major economic importance. It also infects other crops, most notably tomatoes. The virus is spread mechanically from infected plants to scratched or damaged leaves of normal plants.

7 Precautions Followed.

Several precautions can be taken to reduce the mechanical spread of viruses: avoid handling plants (plant seed rather than transplants), remove diseased plants, control weeds and rotate crops, and avoid planting near virus-infected plants.

Do not smoke and handle plants or allow tobacco near the garden.

Govt. College for Women Parade Ground
Jammu

NAME OF The Student - ANKITA MANHAS

Academic programme Persuing - BSC Medica

Semester - 2nd

Class roll no - 37

Registration No - 21GCPA1037

Teacher in charge of the practical group -
Prof. Tahira Firdous

Principal
Govt. College for Women
Parade, Jammu

H.O.D

1 Title of the project - Gametophytic diversity in bryophytes.

2 Objectives of the project - Key objective of the project is that the gametophyte is the dominant life phase in Bryophytes. Gametophyte produces structures known as antheridia and archegonia, which produces the male and female gametes.

3 Content involved - Brief description of Gametophytic diversity in bryophytes, Sexual and asexual reproduction.

4 Materials required for the project - Thermocoal, chart, Colour paper, Colours, marker.

5 Brief description -
Gametophytes are morphologically insignificant in comparison to the sporophyte, they have not been utilized for experimental studies.

Sexual Reproduction
Gametophyte is dominant life phase in Bryophytes. Gametophyte produces structures known as antheridia and archegonia, which produce the male and female gametes.

when mature it dries and finally pops open releasing the spores for dispersal.
Given appropriate conditions, these spores will develop into new gametop-bytes.

Positioning of gametangia and the resulting sporophytes differ in the different bryophyte linages. Common liverwort Marchantia produces umbrella shaped structures that raise the gametangia above the main gametophyte body and the sporophytes develop on underside of these structures

6 Observation -
Gametophyte of bryophytes shows a thalloid organization or differentiates into root - like ; stem, like and stem.

7. Conclusion Drawn - human impact has strongly changed the elevational pattern of diversity.

8. Precautions followed -
Negative effects on bryophytes can be interpreted as an indirect response to increased dominance of vascular plants caused by

Govt. College for Women, Parade Ground. Jammu.

Minor Practical Project

- Name of the student Anchal.
- Academic Programme Pursuing B.Sc Medical
- Semester 2nd
- Class roll no 18
- Registeration No 21GCPA1018
- Teacher in charge of the practical Group

Prof. Tahira Firdous

Principal
Govt. College for Women
Parade, Jammu

4.0.0

1. Title of the Project :- Gametophytic Diversity in bryophytes

2. Objectives of the Project :- The key objective of the project is that the gametophyte is the dominant file phase in Bryophytes Gametophyte produces structures known as antheridia and archegonia, which produces the male and female gametes.

3. Context involved :- Brief description of Gametophytic diversity in bryophytes, sexual and asexual Reproduction.

4. Materials Required for the Project :- Cardboard Thermocoal, Paper, markers, Colours.

5. Brief description :-
Gametophytes are morphologically insignificant in comparison to the sporophyte, they have not been utilized for experimental studies.

Sexual Reproduction
Gametophyte is the dominant life phase in the Bryophytes. Gametophyte produces structures known as antheridia and archegonia, which produce the male and female gametes respectively. Collectively these structures are known as gametangia. While some bryophyte

When mature, a spore generating structure called a capsule, forms at the top of the sporophyte.

Positioning of gametangia and the resulting sporophytes differs in the different bryophyte lineages. The common liverwort Marchantia produces umbrella shaped structures that raise the gametangia above the main gametophyte body and the sporophytes develop on the underside of these structures.

6. Observation:-

Gametophyte of bryophytes shows a thalloid organization or differentiates into root-like, stem-like and leaf-like structures named rhizoids, cauloids.

7. Precautions Followed:-

Negative effects on bryophytes can be interpreted as an indirect response to increased dominance of vascular plants caused by increases in canopy layer, shading and overloaded litter fall on ground vegetation.

Govt College for Women Parade Ground
Jammu
Minor Practical Project

Name - Sania Sharma
Class - Sem II BSc Medical (2021-22)
Sem - 2nd
Class Roll no. - 322
Incharge Teacher : Prof. Tahira Ham

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Govt. College for Women
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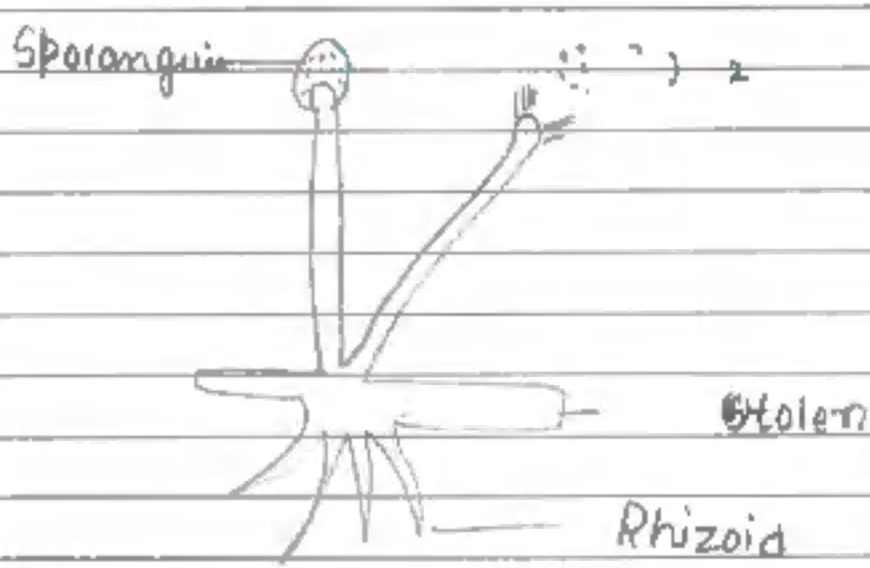
H.O.D

- Rhizoids are formed where the stolon touches the substratum at nodes. They are branched, anchor the mycelium to the substratum and absorb food.

Structure of Rhizopus -



- Sporangiophores are the aerial and reproductive mycelia. They are branched and consist of sporangiospores terminally.

- The cell wall is made up of chitin. The cyto-plasm is multinucleated and consist of other

- The apical part swells up forming sporangium as nuclei and cytoplasm move apically.
- The cytoplasm of sporangium differentiates into the denser peripheral region with more nuclei and the central columella region with fewer nuclei and more vacuoles.
- Sporangiospores develop inside sporangium. They are multinucleated and non-motile.
- The wall of sporangium ruptures after maturation and sporangiospores come out as a powdery mass.
- After getting suitable conditions and substratum, each spore germinates into a new mycelium.

2. <u>Formation of Chlamydospores</u> :-

Chlamydospores are formed during unfavourable condition. An intercalary segment of mycelium develops due to the formation of septae and accumulation of protoplasm. It is thick-walled and detaches from mycelium once it dries. They remain dormant until the favourable condition returns and then germinate to form a new

Govt. College for Women, Parade Ground Jammu

Minor Practical Project

Name of the Student Seema Naz.

Academic Programme Pursuing - Bsc Medical

Semester 2nd

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Class Roll No: 167

Registration No 21GCPA10167

Teacher In Charge of the Practical Group

Prof: Tahira Firdous

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Lytic And Lysogenic Cycles

→ Bacteriophage viruses that infect bacteria may undergo a lytic or lysogenic cycle.

Key Points :

→ Viruses are specific, but almost every species on Earth can be affected by some form of virus.

→ The lytic cycle involves the reproduction of viruses using a host cell to manufacture more viruses the viruses then burst out of the cell.

→ The lysogenic cycle involves the incorporation of the viral genome into the host cell genome, infecting it from within.

Key Terms :

→ Latency :- the ability of a pathogenic virus to lie dormant with in a cell.

→ Bacteriophage : A virus that specifically infect bacteria.

BACTERIOPHAGE :

Bacteriophage are viruses that infect bacteria

Bacteriophage may have viruses that infect bacteria a lytic cycle or a lysogenic cycles and a few viruses are capable of carrying out both. when infection of a cell by a bacteriophage results in the production of new virions. the infection is said to be productive.

LYTIC CYCLE :

With lytic phage, bacterial cells are broken open (lysed) and destroyed after immediate replication of the virion. As soon as the cell destroyed the phage progeny can find new hosts to infect.

An example of lytic bacteriophage is T4 which infects E. coli found in the human intestinal tract.

Lytic phage are more suitable for phage therapy.

Some lytic phage undergoes a phenomena

Latency Period:

Viruses that infect plant or animal cells may also undergo infection where they are not producing virions for long periods. An example is the animal herpes viruses including herpes simplex viruses, which cause oral and genital herps in humans.

Even though there are some similarities b/w lysogeny and latency, the term lysogenic cycle is usually reserved to describe bacteriophage.

Conclusion:

Specialized transduction occurs at the end of the lysogenic cycle, when since the prophage is excised and the bacteriophage enters the lytic cycle.

Since the phage is integrated into the host genome, the prophage can replicate as part of the host.

The broad headings of the formal can be.

Department of Botany

Govt. College for Women, Parade Ground, Jammu

Minor Practical Project.

Name of the student - Poonam Sharma

Academic Programme Pursuing -

Semester - 2nd / IInd

Class Roll. no. - 44

Regestration No. - 21GCPA1044

Teacher Incharge of the Practical Group.

(Tahira Firdous)

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Department of Botany

Govt. College for Woman, Parade Ground, Jammu

Minor Practical Project

Name of the Student :- Varsha Sharma

Academic Programme Pursuing :- BSC

Semester :- 3rd Semester

Class roll No :- 189

Registration No. :- 19.GCPA.2651

Teacher Incharge of the Practical Group :- Dr. Hilal Qazi.

14.0.17

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1. Title of the Project :- Soil Profile.

2. Objectives of the Project :-
Soils are porous natural bodies composed of inorganic and organic matter.
The objective of this lesson is to understand the occurrence and distribution of various layers in soil profile and their importance.

3. Content Involved :-
Soil Profile. Soil horizons. All soils have different types of layers. There are different types of soil, each with its own set of characteristics.

4. Material required for Project :-
Hollow box, white chart, green glass paper, artifical trees and plants, water colours, scissor, Fevicol, etc.

classmate
Date:
Page:

Name of the Student :- Sumera choudhary

Academic programme - B.S.C Medical pursing

Semester . IIIrd

Class Rollno :- 13

Registeration number :- 20GCPA2444.

Teacher incharge of Pratical group

Dr. Ashaq Sir and Dr. Naseer Sir

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Objectives of the project:-

To Study about the Seed dispersal mechanism. Seed dispersal allows plants to Spread out from a wide area and avoid competing with one another for the same resources.

Material required for project:

Chart, paper, thermocoal, Photographs of organisms involved in seed dispersal.

Description of project:

Seed dispersal is an adaptive mechanism in all Seed bearing plants, participating in the movement or transport of Seeds away from their parent plant to ensure the germination and survival of some of the Seeds to adult plant.

Observation:

There are five main modes of Seed dispersal gravity, wind, ballistic, water and by animal, fire. To make sure at least some of the Seeds land in a suitable growing place. the plant has to produce lots of Seed.

Conclusion :-

The link between animal behavior and seed dispersal have central demographic and evolutionary consequences for plant population dynamics, and are likely to be influenced by current and future human activities, such as deforestation and hunting

Precautions :- No over writing
- Avoided plagrism
- Collected information from authenticated sites and books.

Other interested project topics.

(1) food web
(2) Grassland food chain.
(3) Energy flow model.

Signature of the Student :- Sumera CHOUDHARY.

Department of Botany

Govt. College for Women Parade Ground, Jammu

Minor Practical Project

- ***Name of student*** ***Sana Rafi***

H.O.D

- ***Academic Programme pursuing*** ***B.Sc.***

- ***Semester*** ***IIIrd***

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Parade, Jammu

- ***Class Roll no*** ***31***

- ***Registration number*** ***20GCPA2410***

- ***Teacher Incharge of practical group*** ***Dr.Ashaq Sir & Dr.Naseer Sir***

- **Title of the project :** **Soil Profile**

- **Objectives of the project :** (I) To Draw Preliminary idea of Soil Profile.
(II) To study variation in Horizons of Soil on the Basis of Rainfall, Climate & Vegetation.

- **Materials required for project :** It was lockdown period, so all references are taken from Internet & Books. Diagrams from Internet, Illustrations as well from same sources. Information from Book "Ecology & Environment by P.D. Sharma", 'Modern's book of Botany Sem III' & Internet;

- **Description of project** : Soil is generally Composed of number of parallel layers varying in physical and Chemical properties. Each layer is called Horizon. A basic soil profile is composed of three major Horizons → A, B & C. And sometime on the top O-Horizon composed of Humus. Horizon A is Darker in colour & composed of Organic matter and minerals. Horizon E is generally composed of Sand, silt, Quartz. It is lighter in colour & is also known as Zone of Leaching. Horizon B, also known as Top Sub-soil composed of leached out material from Zone A & E. It may also have Iron, Aluminium & other Soluble Salts. Horizon C consists of parent material. And Horizon R is made up of Bed Rock.

- **Observations :** (1) In Arid regions → Humus is Totally Absent. All soluble minerals accumulate in Horizon-B.
(2) In Semi-Arid Regions → There's Dark Humus, Alkaline & Thick Horizon A.
(3) In Temperate Regions → There's O-Horizon & Most Minerals leach out.
(4) In Tropical Regions → Horizon B is Rich in Iron & Aluminium. All soluble salts leach out to lower Horizons. In Tropical Rainforest, Humus is at some extent negligible, because Climate there favour fast

Govt. College for Women, Parade Ground,

Jammu.

Minor Practical Project

Name of the student Anamika Devi

Academic Programme Pursuing B.Sc Medical

Semester 2nd

Class roll No 89

Registration No 21GEBcu1089

Teacher in charge of the practical Group.

Prof. Tahira Firdous

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classmate
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1. Title of the Project :- TMV virus.

2. Objectives of the Project :- The key objective of the project work is to develop the analytical ability and to know about the viral disease which affects all dicotyledonous plants of which most important are tobacco.

3. Context involved : Brief discription of project, Symptoms associated with TMV infections, How is TMV transmitted, How is TMV treated, Who discovered TMV virus

4. Materials required for the project :- Cardboard, Thermocoal, colour paper, Colours and seal etc.

5. Brief description of the Project

Tobacco mosaic virus (TMV) is a plant virus that belongs to the genus Tobamovirus. It is named so because it majorly infects tobacco plants, potatoes, tomatos and other members of the solanaceae family. The infection creates a mosaic like pattern, mottling and discoloration of the leaves.

Symptoms Associated with TMV infections:

- Stunting.
- mosaic pattern of light and dark green (or yellow and green) on the leaves.

was in the forefront of virus research since the end of the nineteenth century. It was the German Adolf Mayer, working in the Netherlands, who in 1882 first described an important disease of tobacco which he called tobacco mosaic disease.

6. Observations:

Tobacco mosaic virus causes a mottled browning of tobacco leaves, and accordingly is of major economic importance. It also infects other crops, most notably tomatoes. The virus is spread mechanically from infected plants to scratched or damaged leaves of normal plants.

7. Precautions Followed.

Several precautions can be taken to reduce the mechanical spread of viruses: avoid handling plants (plants seed rather than transplants) remove diseased plants, control weeds and rotate crops and avoid planting near virus-infected plants.

Do not smoke and handle plants or allow to near the garden.

classmate
Date:
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DEPARTMENT OF BOTANY

Govt Collage for women Parade Ground Jammu

Minor Practical Project

Name : Amisha Bharti
Academic programme pursuing: BSc
Semester: IIIrd
Class Roll No: 339
Registration number : 20GCPA2689
Teacher incharge: Dr. Ashaq Sir and Dr. Naseer Sir.

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Parade, Jammu

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Conclusion: A soil is composed primarily of minerals which are produced from parent material that is weathered or broken into small pieces. Soils are formed through a combination of five important factors :- Parent rock climate, living organism, topography, temperature and water. Climate influences soil formation by providing moisture & heat necessary for weathering of parent material. Water dissolves soluble materials & transfers nutrients to lower part of soil. Further organic matter accumulation & decomposition are influenced by moisture and temperature and by vegetation.

- Other interested project topics
- Soil profile
- Green house effect
- Xerosere

Signature: Anisha Bharti

classmate
Date:
Page:

- NAME OF THE STUDENT :- Anishi Rani
- ACADEMIC PROGRAMME PURSUING :- BSc (Medical)
- SEMESTER :- IIIrd
- CLASS ROLL NO :- 52
- REGISTRATION NO :- 20GCPA2582
- TEACHER INCHARGE OF :- Dr. Aashiq sir
  PRACTICAL GROUP
- TITLE OF PROJECT :- collection of dicot plants in your Area.

- OJECTIVES OF THE PROJECT :-

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- To increase the scientific knowledge.
- Contribute to biodiversity conservation
- Knowing about the local flora of my area.
- to develop techniques for collecting dicot plants.
- Enhance the knowledge of local diversity

classmate
Date:
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- **MATERIAL REQUIRED FOR PROJECT:-**

- Scrab book.
- Plant species.
- Sketch pens.
- Double sided tape.
- Plastic sheet.
- Tapes.

- **DESCRIPTION OF PROJECT:-** Dicot plant collection are component of systematic research. Collection generally consist of samples of plant that are preserved by drying or preserve it. Collection of Dicot plants is the plant which have pair of leaves, or cotyledon, in the embryo of seeds. There are about 175,000 known species but I collected only 15 of them. which are:-

- Mint
- Peas
- Money plant
- Lemon
- Rose
- Mongolia
- Coriander
- Bitter gourd.
- Marmalos
- Tulsi
- Nut meg
- Black pepper

- **OBSERVATION :-** While collecting plants observe their leaf differentiation and outer morphology of dicot plant. Mostly trying to collect herbs and shrubs. Observe their leaf, stem and root as well.

- **CONCLUSION DRAWN :-** By collecting dicot plants species, know so many important information about plant diversity and distribution of in local area. Most likely got more knowledge by collecting as compare to reading or studying in books.

- **Precaution followed :-** choose only herbs more.
  - Dry it first then paste it into scrab book
  - Carefully while pasting them.
  - Use only single - single stems. with leaves and roots

- **PHOTOGRPHI OF PROJECT :-**

(NOT AVAILABLE.)

- **REMARKS ABOUT PROJECT:-** Really intresting and good while collecting plants. exited drawing while waking on it

- **OTHER INTRESTED PROJECT TOPICE:-**

- Carbon cycle
- Green house effect
- Process of soil formation.

- **SIGNATURE OF STUDENT:-** Avishi Rani

DEPARTMENT OF BOTANY

GOVT. COLLEGE FOR WOMEN, PARADE GROUND, JAMMU

MINOR PRACTICAL PROJECT

Name of the Student : Harleen Kour

Academic Programme Pursuing:

Semester : III rd

Class roll no : 228

Registration no : 19GCPA2997

Principal
Govt. College for Women
Parade, Jammu

Teacher incharge of the practical group:
Prof. Tahira Firdous And Prof. Hilal Qazi.

Title of the project : Collection of dicot plant species in our present surrounding.

?. Objectives of the project : collection of dicot plant species in our area and analyse them their leaves arrangement,

Material required for the project : Chart paper, thermocol, ice cream sticks, pen, markers, plants.

Brief description of the project with resources of inputs from (Book, Internet, consultations with teachers and experts. literature perused)

Department of Botany
Govt. College for Women Parade
Minor Practical Project.

Name :- Ruhi
Academic Programme Pursing :- B.S.C (2020-2021)
Semester :- 3rd
Class Roll No. :- 238
Registration No :- 19GCPA3058
Teacher-Incharge - TAHIRA-Firdous-MAM
Title of the Project :- life forms
Objectives of the project :- life purpose consist of the central motivating aims of your life - the reason you get in the morning. Purpose can guide life decisions, influence behaviour, shape goals, offer a sense of direction, and create meaning.

Context Involved :- life, living matter and, as such matter that shows certain attributes that include responsiveness, growth, metabolism, energy transformation, and reproduction.

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H.O.D

Material Required for the Project :- Cardboard box, scrapbook Pages, Pencil, eraser, colours etc.

Project Resources :- I have use internet in this Project and teacher consulation.

observation :- life - form the structure, form, habitats, and life history of an organisms. In Plants, especially characte-istic life - forms.

Conclusion Drawn :- Every life Processes is very important. They help in the survival of all living organisms. Without these all we can't survive.

Q9.

Department of Botany

Govt. College for Women, Parade Ground, Jammu

Minor Practical Project

Name of the student: Tanisha Verma

Academic programme pursuing: B.Sc Med

Semester: 3rd

Class roll no.: 97

Registration no.: 19GCPA1940

Teacher In-charge of the practical group:

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Govt. College for Women
Parade, Jammu

- Title of the project : Water cycle
- Objective of the project : The water cycle is very important on the planet for movement of water from one place to another. Through this project students will be able to recognize that there is lots of water on Earth, but not much is used for drinking and also, through this project we will be able to learn the process that water goes through across the planet.
- Content involved : It involves Evaporation, Transpi-ration, Condensation, Precipitation & Percolation.
- Materials required : Cardboard, Chart paper, Colours, Gum, Pencil, Eraser, Sharpner, scissors etc.
- Brief description of project with resource of input from : Books, Internet.
- Observations : We observed that water cycle is a continuous process of Evaporation, condensation, precipitation & Percolation.
- Conclusions drawn : The conclusion was that

the same water is used again and again with every cycle. There is no loss or gain of water, but the drinking water on Earth is present in very less amount.

- Precautions followed: Put your chart paper on flat surface
  - Don't overdo things.
  - While using scissors, work carefully.
- Attach Photographs of project framed: Framed those on the chart paper.
- Remarks about the project, that how it has generated your interest in the subject: The project of water cycle is very interesting as through this we will know that how our Earth is getting its whole water back but very less for drinking. By Educating ourselves on this topic. We'll educate others too.
- Which other projects you are interested in:

→ Soil profile
→ Xerosere
→ Hydrosere
→ Seed dispersal

11.0.0

Department of Botany (GCW Parade, Jammu)
Minor Practical Project

Name of Student : Taniya Devi
Academic Programme BSC medical
Pursing
Semester III rd
Roll no 28
Registreation No : 19GCPA1951
Teacher Incharge of Practical group

① Title of the Project : 3d model of life form
② Objective of Project : In this we understand the classification of lifeform given Raunkiaer.
③ Content involved : In this the position & degree of protection to perennating buds during adverse condition.
④ Material required : Thermacol, tap, Jute rope, cutter, Stone, sketch black pen etc
⑤ Brief discription of Project with resource of inputs from (Books, internet, consultation & Experts - literature pursued) youtube, google etc
⑥ Observation : Five forms ① Phanerophytes ② Chamae phyte ③ Hemi cryptophytes ④ Greophytes, ⑤ Therophyte
⑦ Conclusion drawn : Five forms given by Raunkiaer
⑧ Precaution : Handle cutter carefully
Cut paper in Symmetry

Camlin Page

Department of Botany

Minor Practical Project

Name - Litu Sharma
Academic Programme - B.S.C. Medical
Semester - Third 3rd
Class Rollno - 153
Registration Number - 19GCPA2437
Teacher Incharge -

1. Title of Project - Detritus food chain
2. Objective: to display the food chain occuring in the environment through drawing
3. Context involve - Detritus food chain
4. Material required - Paper, scissor, coloured pen, colour cardboard

5. Description of project: As we know that decomposers feed on the dead and decaying matter. Thus, the dead organic substances in nature are degraded with the help of decomposers. These decomposers are microorganism. These decomposers are also known as detrivores because they feed on detritus. Therefore, the food chain that begins with dead organic matter is known as a detritus foodchain. Detritivores are further consumers by predators. Normally in a detritus foodchain, the excreted

products by one organism are utilized by another organism

Detritus in biology is defined as particulate dead organic matter and it doesnot ~~involve~~ include dissolved organic matter. This is why it is often includes the bodies or fragments ~~of~~ of bodies of dead organisms and faecal matter. A detritus plays a host to several communities of microbes. These microbes colonize and decompose the organic material it is a feeding on it. It can also be said that they remineralize it.

From internet

6 Observations: The detritus food chain helps in solving inorganic nutrients. Detritus food chain includes subsoil species that can be macroscopic or microscopic in nature. Compared to other kinds of food chains, that detritus food chain has much larger energy flow in terrestrial ecosystem.

Detritus food chain:

Detritus food chain is one type of food chain that starts with dead organic material. The dead organic substances are decomposed by microorganisms. The organisms The organisms that feed on dead organic matter or detritus, are known as detritivores or decomposers. These detritivores are later eaten by predators

detritus, in ecology, matter composed of leaves and other plant parts, animal remains, waste products, and other organic debris that falls into the soil or into bodies of water from surrounding terrestrial communities

Detritus is defined as a small loose pieces of rock that have worn or broken off or any debris or disintegrated material. An example of detritus is small pieces of that broken off by erosion. An example of detritus is the leaves that have fallen from a tree in water

classmate
Date:
Page:

Department of Botany (GCW Parade, Jammu)

Minor Practical project

1. Name of Student - Diya Dhar
2. Academic Programme Pursuing - Bsc Medical
3. Semester - III[rd]
4. Roll No - 142 (Class Roll no.)
5. Registration No - 19GCPA231L
6 Teacher Incharge of the Practical group - Prof Hilal Qazi, Tahira Mam.

---

1 Title of the Project - 3-D model of Water cycle
2. Objectives of the Project - Understand the processes involved in the water cycle.
3. Content involved - The hydrological cycle is powered by energy from sun, is a continuous exchange of moisture between the oceans, the atmosphere and the land
4. Materials required - thermocol, chart paper, artificial plants, cardboard, paint & paint brush, colours, glue, aluminium wire, scissors etc.
5. Brief description of the project with resource of inputs from [Books, internet, consultations with teachers and Experts - Literature pursued] :- Youtube, google, Textbook of Botany [Modern publications], gpm.nasa.gov, wikipedia www.usgs.gov, www.britannica.com etc.
6 Observations :- Observed many important processes such as evaporation, condensation, transpiration, precipitation (rain) and runoff. Although many processes are observed but the total amount of water within cycle remains essentially constant, its distribution among the various processes is continually changing.
7. Conclusions Drawn :- The hydrological cycle is the process by which water circles around the earth. The hydrological cycle is important because of the role water plays in biological processes, climate, and other elemental cycles.

8. Precautions followed :- Handle the cutter carefully.

9. Attach photographs of the project framed.

10. Remarks about the project that how it has generated your interest in the subject :- It helped me understand nature and its processes. learning ecology etc.

11. Which other projects you are interested in

Name → TAMANA SHARMA
Semester → Bsc III Sem Medi-cal
Class Roll no → 31

Registration No.........................
Teacher in charge of the practical Group ....

1. Title of the Project- Seed Dispersal by Water & Animal

2. Objectives of the Project- To study the concept of seed dispersal by water and animals.

3. Context involved:-

4. Materials required for the project:- Hard Board, Colours, Thermacool Plants, fevicol, Black Marker, Scissor, white sheet.

5. Brief description of the project with resource of inputs from (Books, Internet, Consultations with teachers and Experts-Literature Perused)

6. Observations:- Seed dispersal is the movement, spread or transport of seeds away from the Parent Plant.

7. Conclusions Drawn:- Through this model we Know that how seeds are dispersed by different mechanisms.

8. Precautions Followed:- It should be clear and neat and clean.

9. Attach Photographs of the project framed:-

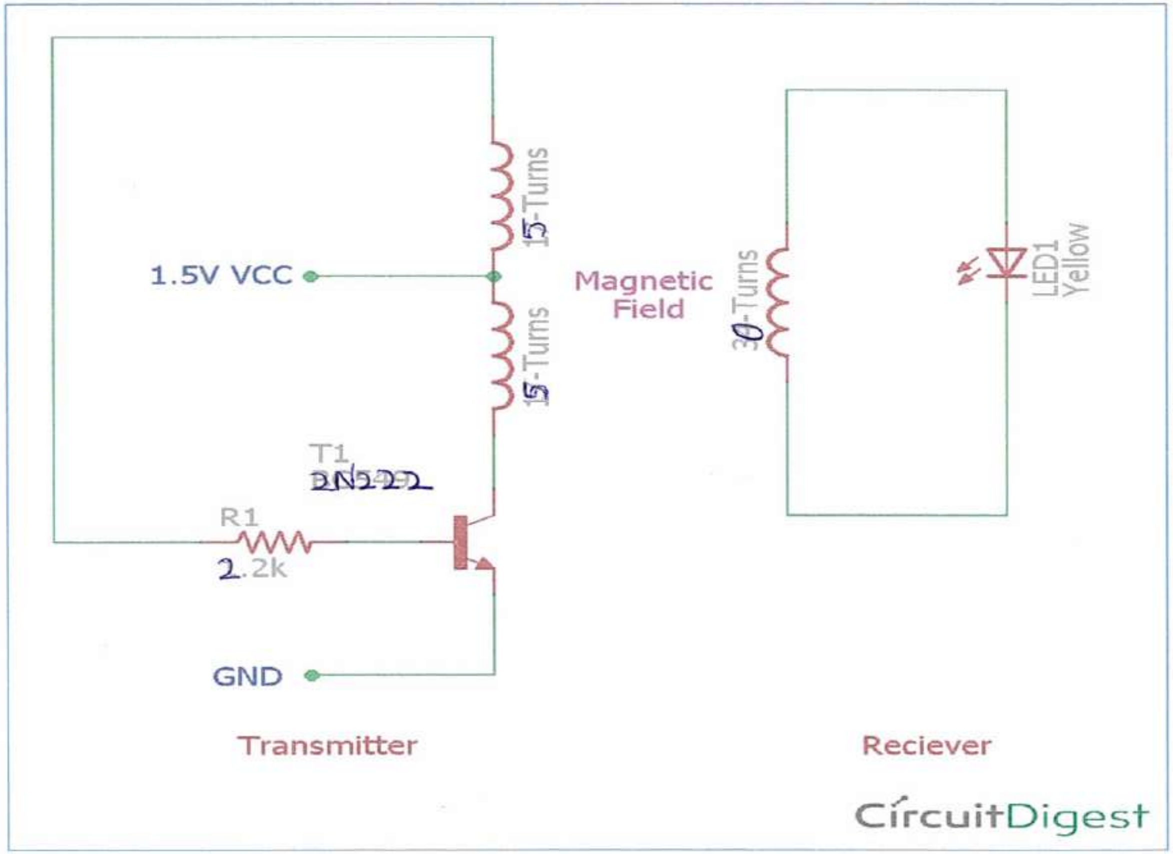
10. Remarks about the project, that How it has generated your interest in the subject:-

11.) Which other Project/s you are interested in

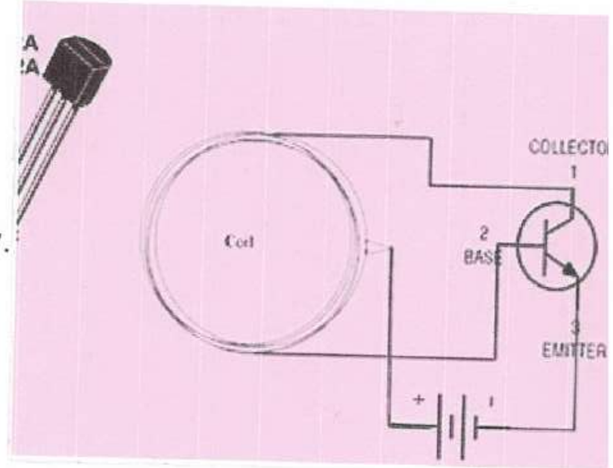
A) Solar System
C) Soil profile

CIRCUIT DAIGRAM

The schematics , for transferring electricity wirelessly to glow an LED , is simple and can be seen in the below diagram , it has two parts , Transmitter , and receiver. At Transmitter side , the coils are connected across the collector of the transistor ,30 turn on both sides. And the receiver is constructed using three components :- Transistor , Resistor and a centre tapped air core inductor or a copper coil. Receiver side has an LED connected across the 30 turns copper coil.



CONSTRUCTION:-



Here the Transistor used in NPN transistor , any basic NPN transistor can be used here like BC547.

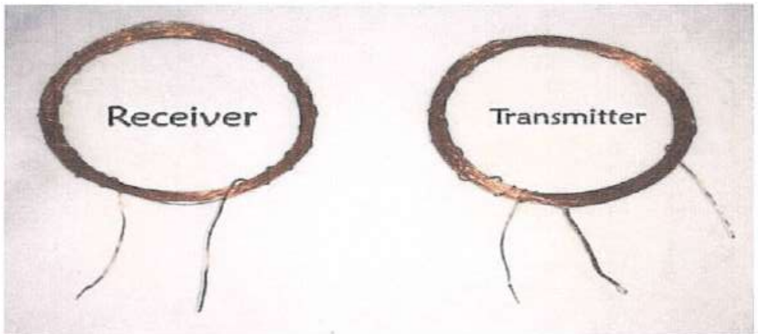
1.COLLECTOR

2.BASE

3.EMITTER

Coil is the crucial part in wireless energy transfer and should be built carefully. In tis project , the Coils are made using copper wire of 29AWG. Center tapped coil formation is done on the transmitter side and a cylindrical coil wrapper like PVC is required to wind the coil.

For the transmitter, wind the wire till 30 turns, then the loop for centre tap connection and again make 30 turns of coil. And for the receiver, make a 30 turns of coil winding without the centre tap.



Govt. College for Women Parade, Jammu

Project on

Rain Alarm

Principal
Govt. College for Women
Parade, Jammu

B.Sc Semester-VI

Session 2020-21

Submitted to:
Mr. Amit Trikha
Deptt. of Electronics
GCW, Parade, Jammu

Prepared by:
Mansi Bhagat
Awantika Sharma
Muskan Khajuria
Sonali Bhagat
Heena Thakur

1. Introduction.

2. List of component.

3. Circuit diagram.

4. Working & Principle.

5. Application.

6. Reference.

Chapter No:-2

INTRODUCTION

Rain Alarm Project is a simple but very useful project that detects Rain (Rain Water) and automatically triggers an alarm or buzzer. Water is a basic need in every one's life. Saving water and proper usage of water is very important. Here is an easy project which will give the alarm when there is rain, so that we can make some actions for rain water harvesting and also save the rain water for using it later. With the help of saving this rain water through rain water harvesting, we can increase the levels of underground water by using underwater recharge technique. Rain water detector will detect the rain and make an alert; rain water detector is used in the reliable circuit of rain water detector which can be constructed at low cost irrigation field, home automation, communication, automobiles etc. Here is the simple and irrigation field, home automation, communication, automobiles etc.

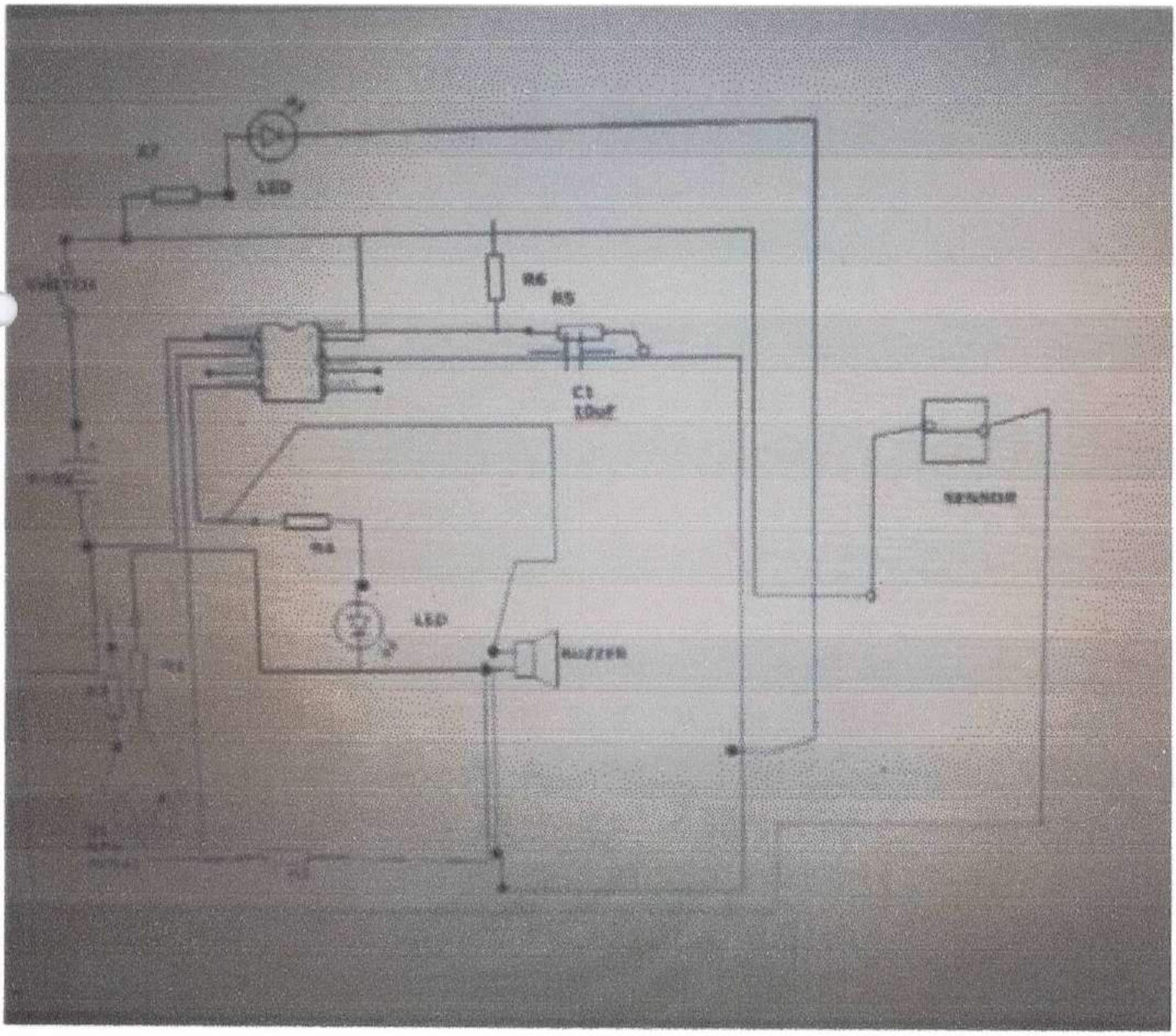
Components

1. Rain sensor
2. 555 Timer IC
3. NPN Transistor BC547
4. Resistors (470, 100k and 1k ohm)
5. Capacitor (10uf)
6. Buzzer
7. Battery 9v

Components For PCB Design:

1. Laser printer
2. Electric Iron
3. 4"*6 sticker
4. Liquid of ferric chloride(Cl3Fe)
5. Mini drill machine
6. Liquid rosin

CIRCUIT DIAGRAM



WORKING PRINCIPLE AND OPERATION

It is a very simple rain alarm circuit which is designed using mainly a transistor, water sensor and a 555 timer IC. Whenever there is a rain, rain drops falls on the rain sensor, and as you can see in the diagram of rain sensor, water on rain sensor would short the Point A and B. As soon as Point A and B become short, a positive voltage would get applied on the base of Transistor Q1, through the resistance R4. Because of the voltage at the base, transistor becomes ON (initially it was in OFF state), and current started flowing form collector to emitter.

Now Reset PIN 4 of the 555 Timer, gets a positive voltage and 555 timer IC becomes ON and Buzzer starts beeping. Here we should note that initially there was no positive voltage at Reset PIN 4 of 555 IC, as it was connected to the ground through resistance R5 (4.7k) and 555 IC only works when Reset pin gets positive voltage.

Here we can see that 555 Timer IC has been configured in Astable mode so that Buzzer generate a oscillating sound (means periodically on and off). This oscillation frequency can be controlled by changing the value of resistor R2 and/or capacitor C1. Pin 5 control Pin, should be connected to ground through a .01uf capacitor. Resistor R3 and R4 has been used to control the transistor's collector and base current respectively.

Rain sensor should be kept at 30-40 degree from the ground, so that water cannot stay on it, for the long time, this will prevent the alarm to going on for a long time.

How a Rain Sensor Works:

A rain sensor is an automated device that shuts off your lawn irrigation system every time it rains. It is a relatively cheap device that can save up to 45 percent of your water bills, help protect the environment and conserve water. A rain sensor is mounted outdoors away from trees and roof over hangs so that it can collect rainwater without obstruction. A rain sensor can either be wired or wirelessly attached into a lawn irrigation system

ADVANTAGES

1. Conserve Water
2. Prevent Disease Damage and Nutrient Loss:.
3. Save Money on Fertilizer:
4. Increase the Life-span of your Irrigation System:
5. Prevent Groundwater and Waterways Pollution:

APPLICATIONS

1. In the irrigation, it will detect the rain and immediately alert the farmer.
2. In automobiles, when the rain detector detects the rain it will immediately active the wipers and inform the driver.
3. In communications, it will boost the power of the antenna and increase the signal strength to send or receive the signals.
4. In normal house hold
5. This can also be used if there is a chemical rain also.

CONCLUSION

The entitle of is project "RAIN ALARM WITH CLOSING FACILITY" project is essential for fertilizer and cottage industries. The main purpose the project is to avoid mental stress and to the prevent material from rain. This is project can construct easily using simple electronics component

DEPARTMENT OF BIOTECHNOLOGY

GOVT. COLLEGE FOR WOMEN PARADE GROUND, JAMMU

PROJECT FILE OF BIOTECHNOLOGY ON

SEMI-AUTONOMOUS CELL ORGANELL

CHLOROPLAST

TEACHER INCHARGE OF THE PROJECT

DR. MAHAK TUFCHI

Principal
Govt. College for Women
Parade, Jammu

Submitted by
Saloni Bhasin
Rollno - 330
(Session - (2020-2021)

TITLE OF THE PROJECT:

- **Structure and Functions of Chloroplast**

OBJECTIVE OF THE PROJECT:

- CHLOROPLASTS work to convert light energy of the sun into sugars that can be used by cells. The entire process is called photosynthesis and it all depends on the little green chlorophyll molecules in each chloroplast. Plants are the basis of all life on Earth. They are classified as the procedures of the world.

CONTEXT INVOLVED:

- INTRODUCTION OF THE CHLOROPLAST

- DISCOVERY
- CHLOROPLAST DNA
- STRUCTURE
- FUNCTIONS OF THE CHLOROPLAST.

MATERIAL REQUIRED FOR THE PROJECT

- Phone, word app, rough notebook, pen, pages.

BRIEF DISCUSSION OF THE PROJECT WITH RESOURCE OF INPUT FROM:

- BOOKS AND INTERNET

INTRODUCTION: A chloroplast is a type of membrane bound organelle known as plastid that conducts photosynthesis mostly in Plant and Algal Cells.

Plant cell having chloroplast

The photosynthetic pigment chlorophyll captures the energy from sunlight, converts it, and stores it in the energy storage, molecules ATP and NADPH while freeing oxygen from water in the cells. The ATP and molecules from carbon dioxide in a process are known as Calvin cycle. The number of chloroplasts per cell varies from one in unicellular algae up to 100 in plants like Arabidopsis and wheat.

A Chloroplast is characterized by its two membranes and a high concentration of chlorophyll. Other plastid types, such as the leucoplast, and the chloroplast contain the little chlorophyll and do not carry out photosynthesis.

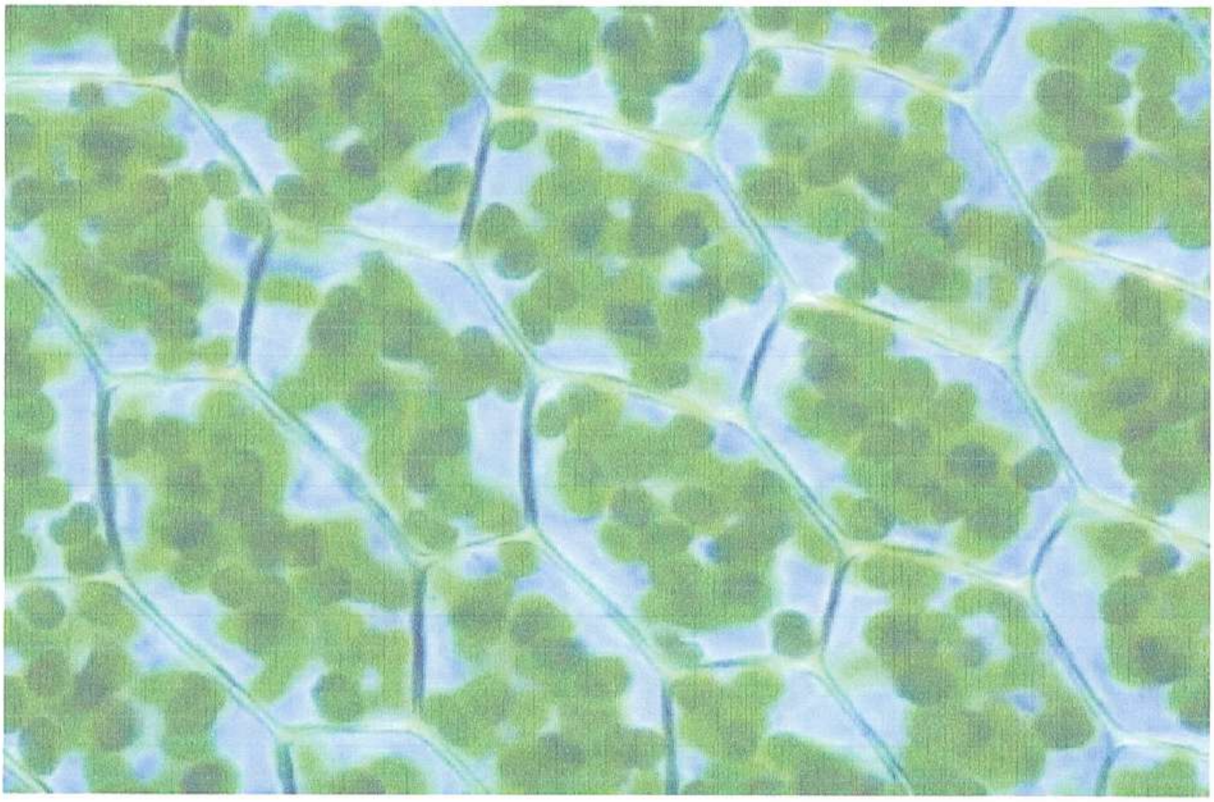
Chloroplast like mitochondria, contain their own DNA, which is thought to be inherited from their ancestor – a photosynthetic cyanobacterium that was regulated by an early eukaryotic cell. Chloroplasts cannot be made by the plant cell and must be inherited by each daughter cell during cell division.

The word chloroplast is derived from the Greek words Chloros , which means green, and plastes, which means "the one who forms".

Discovery :

The first definitive description of a chloroplast was given by Hugo ven Mobl in 1837 as discrete bodies within the green plant cell. In 1883, Andreas Franz Wilhelm Schimper would name these bodies as "Chloroplastids". In 1884, Edward Star burger adopted the term "Chloroplasts".

CHLOROPLAST DNA: like other types of plastid, contain a genome separate from that in the cell nucleus. The existence of Chloroplast DNA was identified biochemically in 1956, and confirmed by electron microscopy in 1962. The discoveries that the chloroplast contains ribosomes and performs protein synthesis revealed that the chloroplast is genetically semi –autonomous.Chloroplast DNA was first sequenned in 1906. Since then hundreds of chloroplast DNAs from various species have been sequenced, but



MICROSCOPIC VIEW OF CHLOROPLAST

Plant Cell Chloroplast Structure

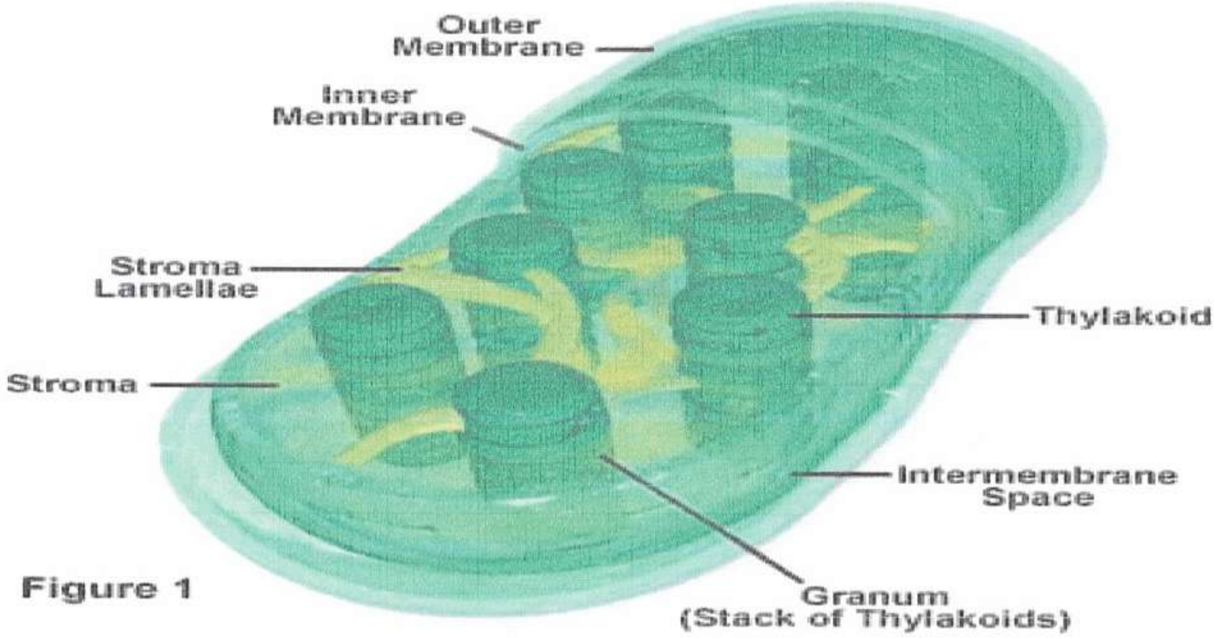


Figure 1

STRUCTURE OF CHLOROPLAST

They are mostly these of load plants and green algae, red algae and other algal groups are extremely under represented, potentially introducing some bios in views of typical chloroplast DNA structures and content.

STRUCTURE

ALL chloroplast have at least three membranes systems – The outer chloroplast membrane, and the thylakoid system. Chloroplast that is the product of secondary end symbiosis may have additional membranes surrounding these three. Inside the outer and inner chloroplast membranes is the chloroplast stroma, a semi-gel like fluid that makes up much of a chloroplasts volume, and in which the thylokoid system floats.

The chloroplast double membrane is also often compared to the mitochondrial double membrane. The only chloroplast structure that can consider analogous to it is the internal thylokoid system.

OUTER CHLOROPLAST MEMBRANE:

The outer chloroplast membrane is a semi-porous membrane that small molecules and ions can easily diffuse across. However, it is not permeable to large protein, so chloroplast, polypeptide being synthesized in the cell cytoplasm must be transported across the outer chloroplast membrane by the TOC complex or transpolar on the outer chloroplast membrane.

The chloroplast membranes sometimes protruded out into the cytoplasm, forming a stromules or stoma – containing tubule. Stromules are very rare in chloroplasts, and are much more common in other plastids like chromoplasts and amyloplasts in petals and roots, respectively. They may exist to increase the chloroplasts surface area for cross membrane transport, because they are often branched and tangled with the endoplasmic reticulum.

Intermembrane space and peptidoglycan wall: Usually , a thin intermembrane space about 10-20nm thick exits between the outer and inner chloroplast membranes.

Glaucophyte algal chloroplasts have a peptidoglycan layer between the chloroplast membranes. It corresponds to the peptidoglycan cell wall of their

INNER CHLOROPLAST MEMBRANE:

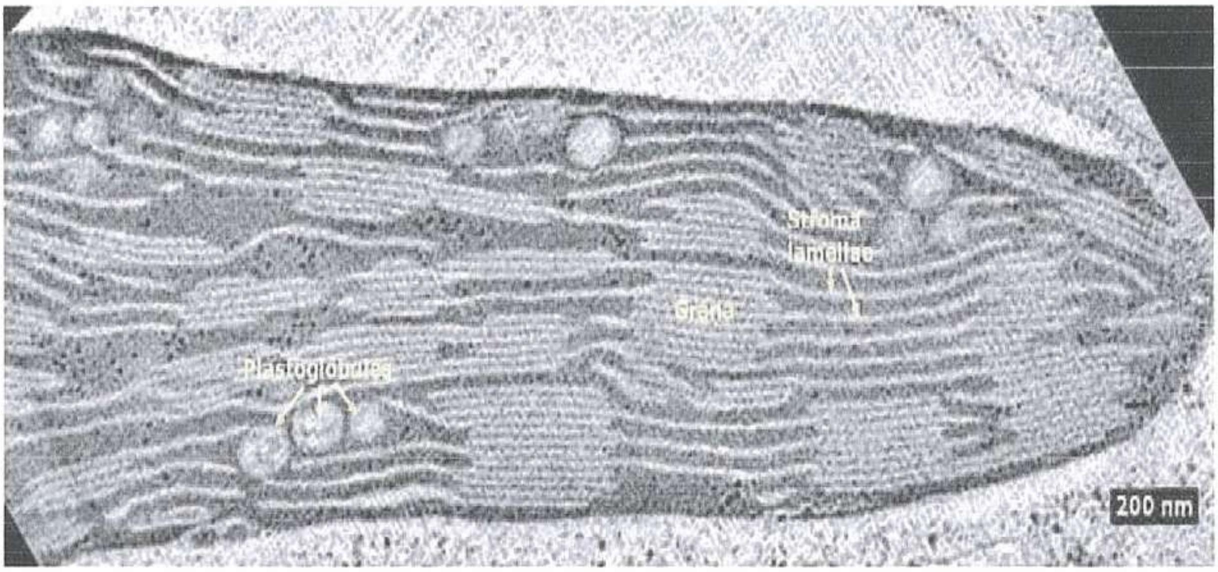
THE inner chloroplast membrane borders the storma and regulates passage of materials in and out of the chloroplast. After passing through the TOC complex in the outer chloroplast membrane, polypeptides must pose through the TIC complex which is located in inner chloroplast membrane.

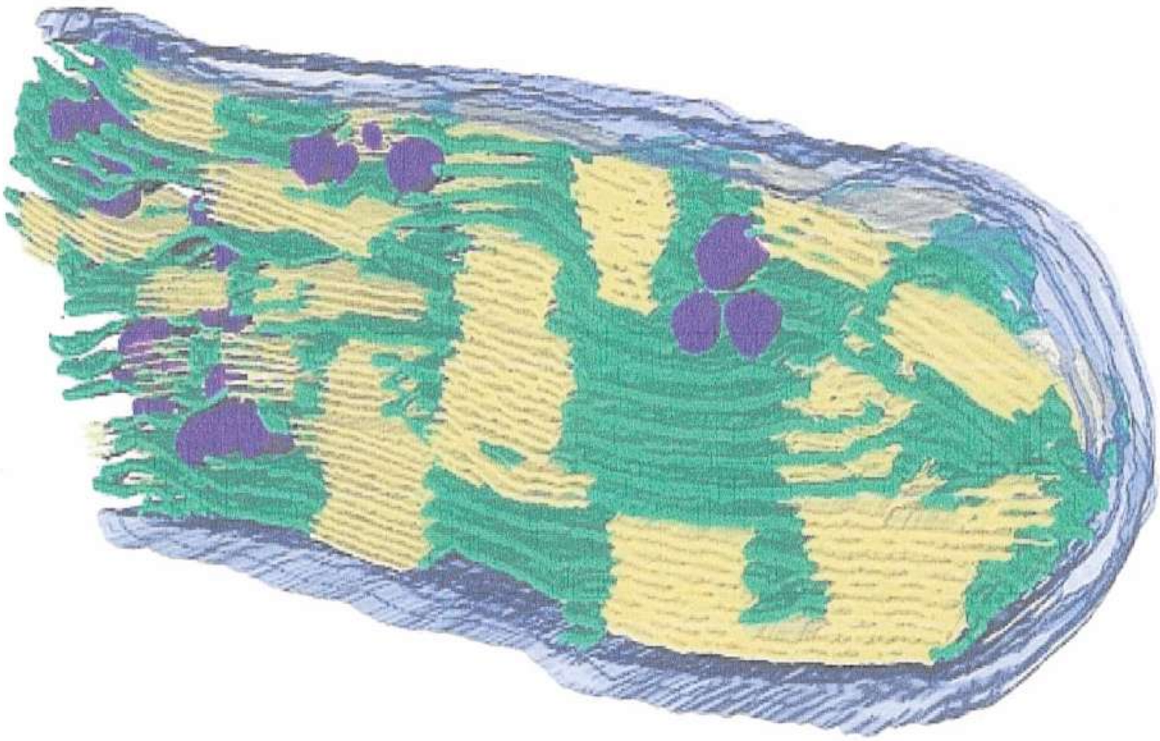
Peripheral reticulum:

Some chloroplasts contain a structure called the chloroplast peripheral structure it is often found in the chloroplasts of C4 plants, though it has also been found in some C3 angiosperms and even some gymnosperms.

Its purpose in thought is to increase the chloroplasts surface area for cross-membrane transport between its stroma and the cell cytoplasm. The small vesicles sometimes observed may serve as transport vesicles to shuttle stuff between the thylakoids and intermembrane space.

Stroma : the protein rich alkaline, aqueous fluid within the inner chloroplast membrane and outside of the thylakoid space is called the stroma, which corresponds to the cytosol of the original cynobactariaum. Nucleosides of chloroplast with plastoglobuli, starch granules, and many proteins can be found floating around.





Thylokoid system of Chloroplasts

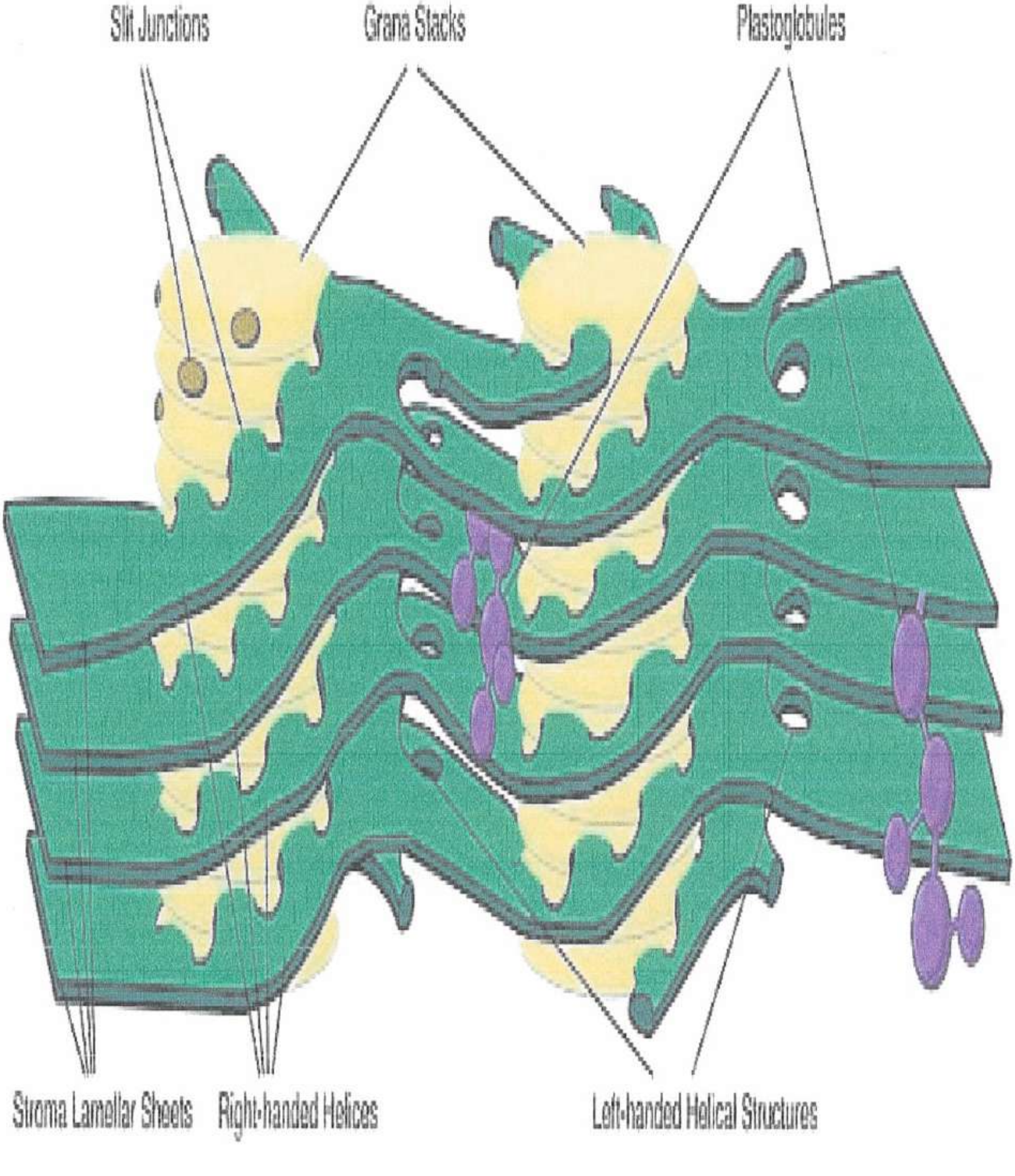
The cation cycle which fixes CO_2 into G3P takes place in the storma.

Chloroplasts have their own ribosomes, which they use to synthesize are about two- thirds the size of cytoplasmic ribosomes. They take mRNAs transcribed from the chloroplast DNA and translate them into protein.

Thylokoid system: They are small interconnected sacks which contain the membrane that the light reactions of photosynthesis tale place on the word thylokoid comes from the Greek word Thylolos which means “Sack”.

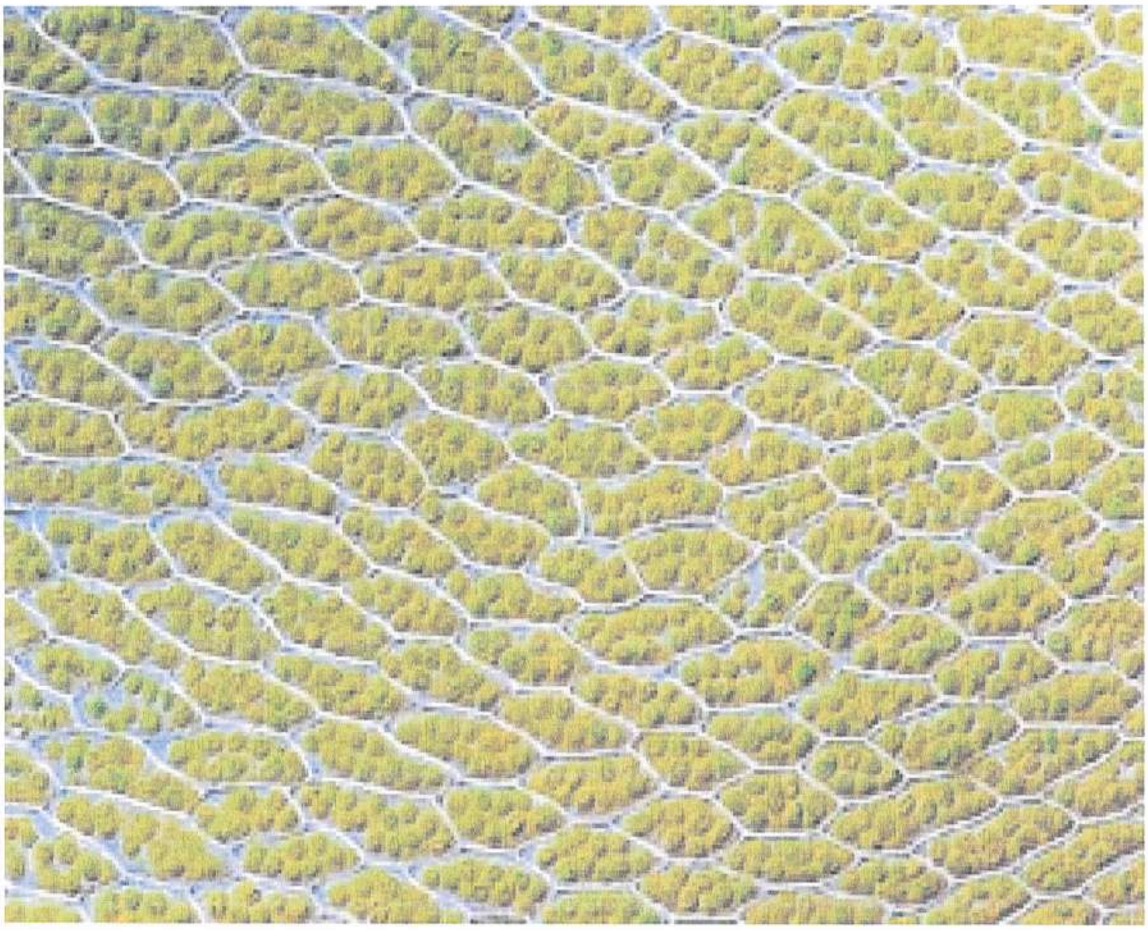
Suspended within the chloroplast stroma is the thylokoid system, a highly dynamic collection of membranes sacks called thylokoids of membranes sacks called thylakoids where chlorophyll is found and the light reactions of photosynthesis happen. In most vascular plant chloroplasts the thylakoid are arranged in stacks called grana.

There are two types of thylakoids – granal thylakoids , which are arranged in grana, and stromal thylakoids , which are arranged in contact with stroma. Granal thylakoids are pancake- shaped circular disks about 300-600 in diameter. Stromal thylakoits are helicoid sheet that spiral around grana. The flat tops and bottoms of granal thylokoids contain only the relatively



Thylakoid structure

flat protein complex. This allows them to stock tightly , farming grana with many layers of tightly oppressed membrane, called granal membrane increasing stability and surface area for light capture.



Chloroplast visible in the cells of a mess.

Functions:

- Absorption of light energy and conversion of it into biological energy.
- Production of NADPH2 and evolution of oxygen through the pores of photosys of water.
- Breaking of 6 carbon atom compound into two molecules of phosphoglyceris acid by the utilization of assimilatory powers.
- The most important function of chloroplast is to make food by doing photosysthesis.
- Light reactions takes place in the membranes of the thylakoids.

Conclusions:

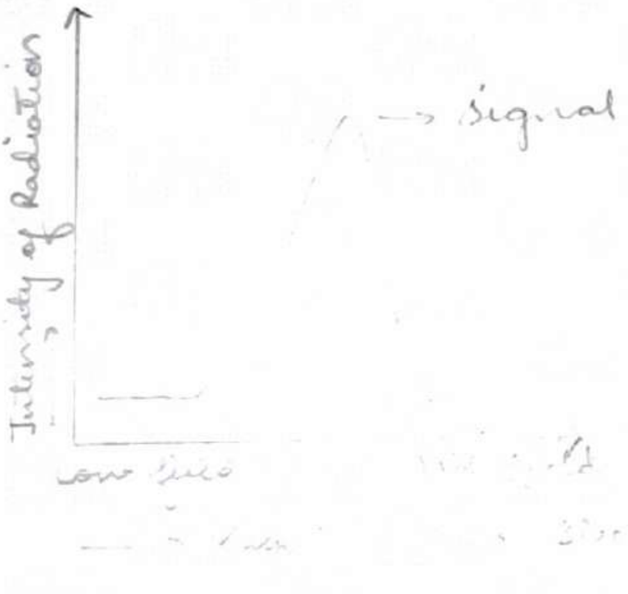
Plant cells have certain distinguished features including chloroplasts, cell wall and intracellular vacuoles.

Photosynthesis takes place in Chloroplasts, cell walls allow plants to have strong, upright structures, and vacuoles help regulate how cells handle water and storage of other molecules.

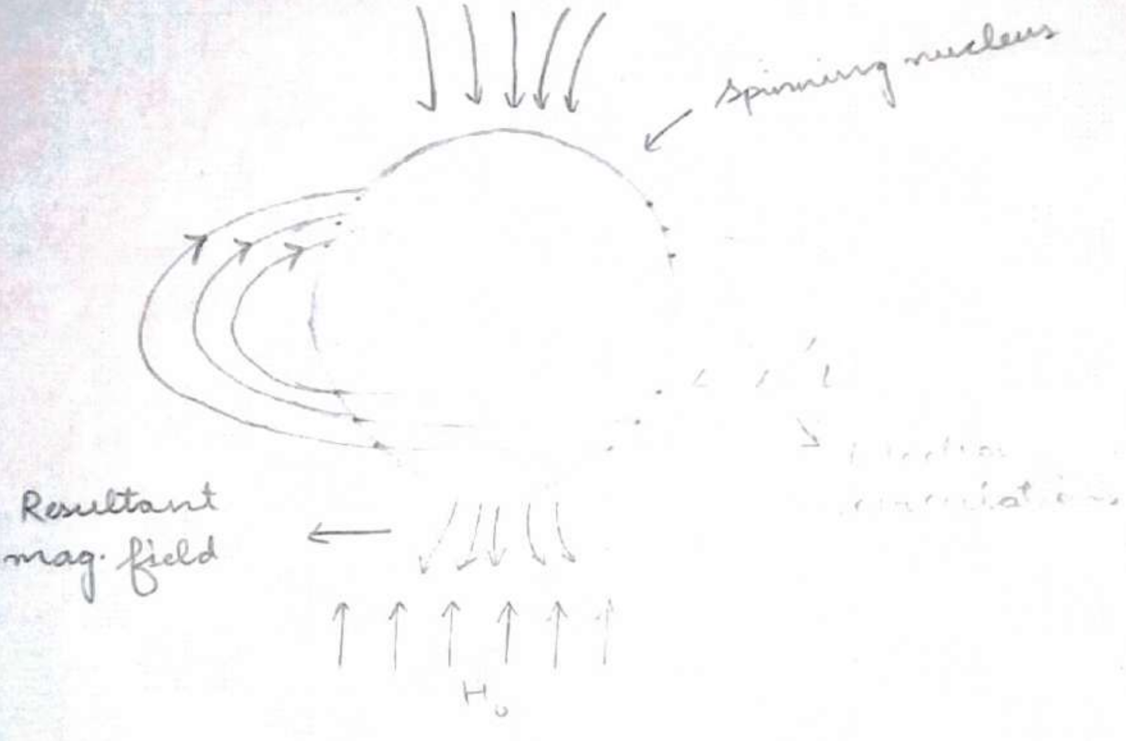
Precautions followed:

- **Data should be reliable**
- To the relevant.
- Language should be simple and easy to understand.
- Pasted pictures should be clear.

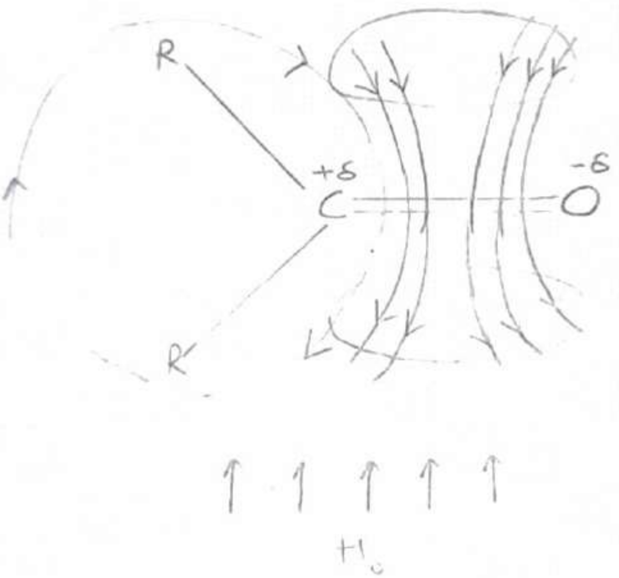
Principal
Govt. College for Women
Parade, Jammu



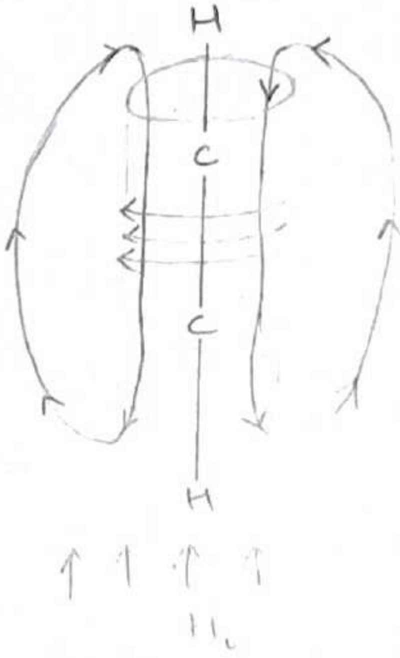
A [illegible] signal



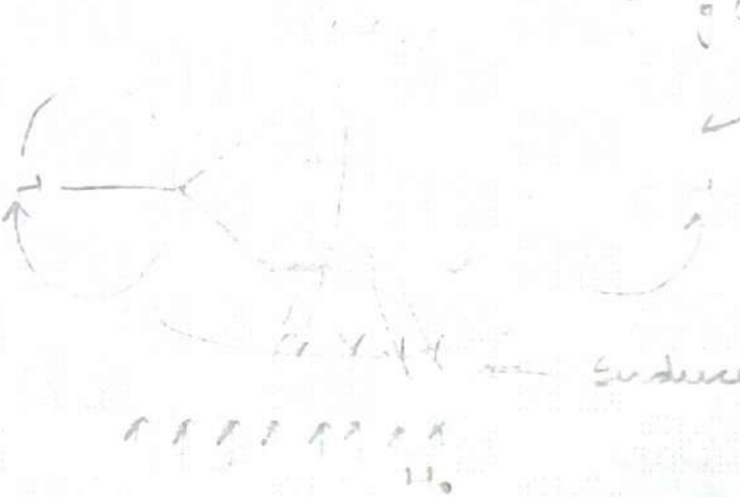
Shielding due [illegible] of
σ-es of [illegible]



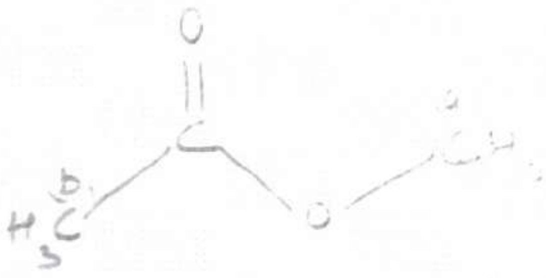
deshielding of aldehydic proton



circulation of [illegible] of acetylene to produce [illegible] field which [illegible] field at proton



Circulation of π-e^- of benzene



Methyl acetate

DEPARTMENT OF BOTANY

Govt. College for Women, Parade Ground, Jammu

MINOR PROJECT

Name of the student : Nazish Kazmi

Academic Programme Pursuing : B.Sc

Semester : 3rd

Roll No : 171

Registration No : 19GCPA2521

Teacher incharge of the Practical Group : Hilal Qazi

Title of the Project : Ecological Pyramids

Objectives of the Project: Show the feeding of diff. organisms in diff ecosystems, shows the efficiency of energy transfer.

Context involved :

Material required for the project :

Brief description of the project: graphic representation of trophic structure and function of an ecosystem starting with producers at the base and successive trophic levels forming the apex is k/as ecological pyramids they have 3 types which are mentioned under this that are: Number, biomass & energy which gradually decrease from the producer level to the consumers level.

Observations :

Conclusion drawn: This is a representation but doesn't take into account food web and donot occur naturally.

Attach Photographs of the project :

Name : Neha Thakur.
Semester : III. (B.S.c Medical)
RollNO : 13.

Registration No........................
Teacher in charge of the practical Group ....

1. Title of the Project:- Life forms.

2. Objectives of the Project:-

3. Context involved:-

4. Materials required for the project:- Thermacol, Colours, Drawing sheet, Scissor, Black Marker.

5. Brief description of the project with resource of Inputs from (Books, internet, Consultations with teachers and Experts-Literature Perused)

6. Observations:- Graphical representation of Life forms.

7. Conclusions Drawn:- Through this model we know that the different liforms are grown in different stage.

8. Precautions Followed:-. It should be neat and clean.

9. Attach Photographs of the project framed:-

10. Remarks about the project, that How it has generated your interest in the subject.:-

11) Which other Projects you are interested in
— water cycle.

Signature : Neha Thakur.

iv) A proper format for the minor project may be devised so that the students shall work on the project in a structured manner.

The broad headings of the format can be.

Department of Botany **(for example)**

Govt. College for Women, Parade Ground, Jammu.

Minor Practical Project

Name of the Student....Sakshi Dhar

Academic Programme Pursuing....B.Sc Medical

Semester ......3rd......

Class roll No.....147.......

Registration No. 19GCPA2339

Teacher in charge of the practical Group ....

1. Title of the Project:- Ecological Pyramid (no, energy, biomass)

2. Objectives of the Project:-

3. Context involved:-

4. Materials required for the project - Thermocol, colour tape, Sketch colour, wax colour, fevicol, pencil etc.

5. Brief description of the project with resource of inputs from (Books, Internet, Consultations with teachers and Experts-Literature Perused)

6. Observations:-

7. Conclusions Drawn:-

8. Precautions Followed:-

9. Attach Photographs of the project framed

10. Remarks about the project that How it has generated yo... interest in the subject?

11 Which other Project/s you are interested in

A)

B) ....

C)........

Signature of the Student.

This format is only indicative of the parameters the student is supposed to register their responses to the projects. However, the departments are free to modify it according to their requirements, while retaining certain items specific to the identification of the project, the department and the student.

2 With regards to the inspection by UGC committee regarding the gr[illegible] extension of autonomy to the college the following observations [illegible] made and suggestions extended

a) All HoDs shall expedite the information sought from them on the prescribed format (already communicated). The HoDs confirmed

iv) A proper format for the minor project may be devised so that the students shall work on the project in a structured manner.

The broad headings of the format can be.

Department of Botany (for example)

Govt. College for Women, Parade Ground, Jammu.

Minor Practical Project

Name of the Student Amrita Sharma

Academic Programme Pursuing B.Sc. Medical

Semester 3rd BSc.

Class roll No. 29

Registration No. 19GCPA1262

Teacher in charge of the practical Group Hilal Qazi

1. Title of the Project:- Hydrosere

2. Objectives of the Project:-

3. Context involved:-

4. Materials required for the project:- Scrapbook and colours.

5. Brief description of the project with resource of inputs from (Books, Internet, Consultations with teachers and Experts-Literature Perused)
Internet :- Google
Book :- Helpline

6. Observations:-

7. Conclusions Drawn -

8 Precautions Followed

9 Attach Photographs of the project framed

10 Remarks about the project that how it [illegible]

11 Which other Project/s you are interested in

A) Food chain

B) ....

C) ....

Amrita Sharma.

Signature of the Student.

This format is only indicative of the parameters the student is supposed to register their responses to the projects. However, the departments are free to modify it according to their requirements, while retaining certain items specific to the identification of the project, the department and the student.

2 With regards to the inspection by UGC committee regarding the gr[illegible] extension of autonomy to the college the following observations [illegible] made and suggestions extended.

a) All HoDs shall expedite the information sought from them on the prescribed format (already communicated). The HoDs confirmed

Govt College for Women, Parade Ground,
Jammu

Name of the Student

Manisha Manhas

Academic Programme Pursing

B.Sc. Medical

Semester

3rd

Class roll no.

30

Regesteration no.

19GCPA1267

Teacher incharge of the Practical group ______

1. Title of the project

XEROSERE

2. Objectives of the Project
3. Content involved
4 Material required for the project:- Scrap book, Pens,
5 Brief description of the projection with ~~so~~ resource of inputs from Books, Internet, Consultation with teachers and experts - literature Perused.
6. Observation
7. Conclusion Drawn.

iv) A proper format for the minor project may be devised so that the students shall work on the project in a structured manner.

The broad headings of the format can be.

Department of Botany **(for example)**

Govt. College for Women, Parade Ground, Jammu.

Minor Practical Project

Name of the Student EKTA Kumari

Academic Programme Pursuing ....

Semester 3rd

Class roll No. 23

Registration No. 1967CPA1198

Teacher in charge of the practical Group ....

1. Title of the Project:- Green house gases
2. Objectives of the Project:-
3. Context involved:-
4. Materials required for the project:-
5. Brief description of the project with resource of inputs from (Books, Internet, Consultations with teachers and Experts-Literature Perused)
6. Observations:-
7. Conclusions Drawn:-
8. Precautions Followed:-
9. Attach Photographs of the project framed
10. Remarks about the project that how it has generated ... the subject?

11 Which other Project/s you are interested in

A)

B) ....

C) ....

Signature of the Student.

This format is only indicative of the parameters the student is supposed to register their responses to the projects. However, the departments are free to modify it according to their requirements, while retaining certain items specific to the identification of the project, the department and the student.

2 With regards to the inspection by UGC committee regarding the gr extension of autonomy to the college the following observations made and suggestions extended.

a) All HoDs shall expedite the information sought from them on the prescribed format (already communicated). The HoDs confirmed

TOPIC DATE

PROCEDURE :-

- First of all, it is required to go through the structure theoretically so as to avail the suitable and required materials for making the project.
- Use thermocol as a base for describing the inner and outer nuclear membranes.
- Cut through a semicircle and a whole circle representing the Nuclear pores, one at the edge and other in the midde section.
- The circle cut out at the periphery can be used to describe the sectional structure of the Nuclear Pore complex, while the integral one shows the arrangement of nuclear basket completely, containing eight spokes.
- Use clay to make and define the boundries of three ring like, eight fold containing layers, namely the cytoplasmic, nuclear and the laminal ring.
- Use chart and colours to differentiate and highlight certain parts of the model.
- Use slips to mark and denote the name of different structures.
- Use spokes to make nuclear basket and toothpicks to denote structures.
- Neatly and carefully construct the given project i.e Nucleopore.
- Visualize its functioning for better understanding and completion of the project.

Nuclear Pore Complex

→ The most distinctive feature of the nuclear envelope is the presence of numerous nuclear pores.

→ These are **small cylindrical channels** that extend through both nuclear membranes, providing **direct contact with the cytosol and the nucleoplasm.**

→ The nuclear pores are **lined with an intricate protein structures** for regulating the movement of larger molecules across the nuclear pore, collectively known as **Nuclear pore Complex.**

Structure :-

- The Nuclear Pore Complex is about 100 - 125 nm in diameter. It is composed of about 500 proteins collectively called **nucleoporins**.
- The nucleoporins are arranged in three ring-like arrays of protein stacked one on the top of other.
- Each ring displays an **eight fold symmetry** and is interconnected by series of spokes arranged in vertical fashion.
- In addition, the nuclear pore complex has cytoplasmic fibers, a central plug and a nuclear basket.
- The **two rings**, the cytoplasmic and the nuclear ring are analogous and **run parallel** to each other.
- Cytoplasmic ring located on the rim of the cytoplasmic aspect of nuclear pore, possesses **cytoplasmic filaments.**
- The nuclear ring, present towards the nucleoplasm is attached to filamentous, basket like structure,

TOPIC DATE

called as the **Nuclear basket**.
It becomes deformed during the process of Nuclear export.

Input Resources :-
Cell biology and genetics - Veer Bala Rastogi
Sites visited [sciencedirect.com
www.wikipedia.com.

Observation :-

- The **model shows the pore complex as** a whole **wheel lying on its side** within the nuclear envelope.
- Two parallel rings, the cytoplasmic and the nuclear ring are seen joined by a middle ring, the luminal spoke ring.
- The rings have eight fold symmetry. Eight spokes extend from Each ring to the wheel's hub, the central granule or transporter.
- The transporter carries out import and export of proteins and RNA.
- Following are the structures observed in a Nuclear Pore :-
  - Cytoplasmic Ring and Cytoplasmic filaments.
  - Nuclear Ring and nuclear basket.
  - Luminal spoke ring and transporter proteins.
  - Eight folds in rings containing eight spokes.

TOPIC DATE

- Title of the Project :- Nuclear Pore.

- Objectives of the Project :-

→ To study the structure of Nuclear pore, its importance as a channel of communication between the interior of nuclear compartment and the cytoplasm of the cell.

- Context involved :- Nuclear pore complex.

→ It includes **nuclear membranes**, two rings i.e **cytoplasmic and nuclear ring** and the **nuclear basket** with nuclear cage consisting of eight spokes in each nuclear pore.

- Materials Required for the project :-

Brief understanding of the structure so as to use materials in a wide range to prepare Model. Thermocol, spokes, clay, toothpicks, craft paper, sticking glues, colours etc.

TOPIC DATE

Department of Botany

GCW Parade, Jammu.

MINOR PRACTICAL PROJECT

- Name of the student :- Mansi Rani
- Class Roll no. :- 100 (Even grp.)
- Academic programme pursuing :- B.Sc. (Medical)
- Semester :- 5th
- Registration no. :- 19gcpa3255

Teacher incharge of the Practical group :- Dr. Shallu Sambyal Ma'am.

Title of the Project :- Nuclear Pore

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TOPIC DATE

Conclusion drawn:-

→ The nuclear pore is an important channel of communication between the interior of the nuclear compartment and the cytoplasm of the cell.

→ These are small circular openings in the nuclear envelope, and their density (no. per unit surface area) varies greatly with cell type and activity.

→ A typical mammalian nucleus has about 3000 - 4000 pores.

→ The nuclear pore complexes (NPCs) are the sites of exchange of macromolecules between the cytoplasm and the nucleus.

→ The nuclear pore complex has a passive diffusion channel, 9nm in diameter, permitting diffusion of many but not all proteins including Cytochrome C.

→ Several small proteins including cytochrome C, histones and other large proteins pass through NPC by an active transport process.

→ NPC helps in bidirectional Nucleocytoplasmic transport.

Precautions followed :-

- Careful handling of the material required.
- Understanding the structure in detail through proper and various illustrations to avoid any kind of mistake related to model construction.
- Taking suggestions and help for creating a better prespective of the topic.

0. Remarks about the project that how it has generated your interest in the Project.

1. Which other Project/ you are interested in

A) Dical Species

B) mono coot

C) food chain etc.

Signature of the Student. Amina Akhter

Principal
Govt. College for Women
Parade, Jammu

H.O.D

Department of Botany
Govt. College for Women, Parade Ground, Jammu
Minor Practical Project

Name of the student :- Hasina-Banoo

Academic Programme Pursuing :-
Semester :- IIIrd sem Medical

class roll no :- 134

Registration No :- 19GCPA2268

Teacher Incharge of the Practical Group :- Hilal Qazi

1. Title of the project - Hydrosere
2. objective of the project - To make a project of Hydrosere.
3. Context involved - Hydrosere and stages of Hydrosere.
4. Material required for the project - Scrap book, chart, glue. pen, tap, print out of hydrosere stage etc.
5. Brief description of the project with resources of Inputs form (Books, Internet, Consultations with teachers and Experts literature perused).

6. observations :- Hydrosere is a primary succession sequences which develop in aquatic environments such as lakes and ponds. It results in conversion of water body and its community into a land community. If water bodies large and very deep a strong wave of action at work. therefore in this bodies a noticeable change cannot be observed.

DEPARTMENT OF BOTONY

Govt. College for Women, Parade Ground, Jammu

Minor Practical Project

Name of The Student :- Neha Sarotia

Academic Programme Pursuing :- To make a model of morphological study of Tobacco Mosaic Virus (TMV).

Semester :- First

Class Roll No :- 14

- Regestration No :-
- Teacher Incharge of the Practical Group :- Dr. Masrat Jan
- Title of The Project :- Model of Tobacco Mosaic Virus (TMV).
- Objectives of The Project :- To study the morphological parts of Tobacco Mosaic Virus (TMV).
- Context involved :- This context is in our syllabus and I use Google for making the Model of an TMV.
- Materials Required for The Project :-

1. Thermacoal
2. Sketch colour
3. Poster Colours
4. Sparkle Tape
5. Chart
6. Wax colours.
7. Fevicol.

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Govt. College for Women
Parade, Jammu

H.O.D
Botany

▸ Brief Description of The Project with resource of Inputs.

Tobacco Mosaic Virus (TMV)

Tobacco Mosaic Virus is the type member of a large roup of viruses within the gens Tobamovirus. The rod-shaped virus particles (virions) of TMV measure about 300 nm X 15 nm. A single TMV particle is composed of 2,130 copies of the coat protein (CP) that envelope the RNA nolecule of about 6,40 genes: two replicase-associated proteins that are directly translated from The TMV RNA, and the movement protein and a coat protein that are translated from subgenomic RNAs.

Observations :- Tobacco Mosaic Virus (TMV) is a positive-sense single-stranded RNA virus species in the genus Tobamovirus that infects a wide range of plants especially tobacco and other members of the family Solanaceae.

▸ Remarks about the Project, that How it has generated your interest in the subject :-

The teacher will explain this topic very clearly. Generally, The virus is present in ~~our~~ these plants is found in our areas very easily. So, that's why we have to generated the idea to make The model of TMV.

▸ Which other Project you are interested in :-

(A) Seed Germination

(B) Herbarium

GOVT. COLLEGE FOR WOMEN PARADE

PROJECT WORK

COLLECTION OF ALGAL SPECIES FROM OUR LOCALITY

PROF. INCHARGE ÷ DR. MASRAT JAN

PROF. SIGNATURE ______

NAME – MONIKA SHARMA

CLASS – BSC IST SEM.

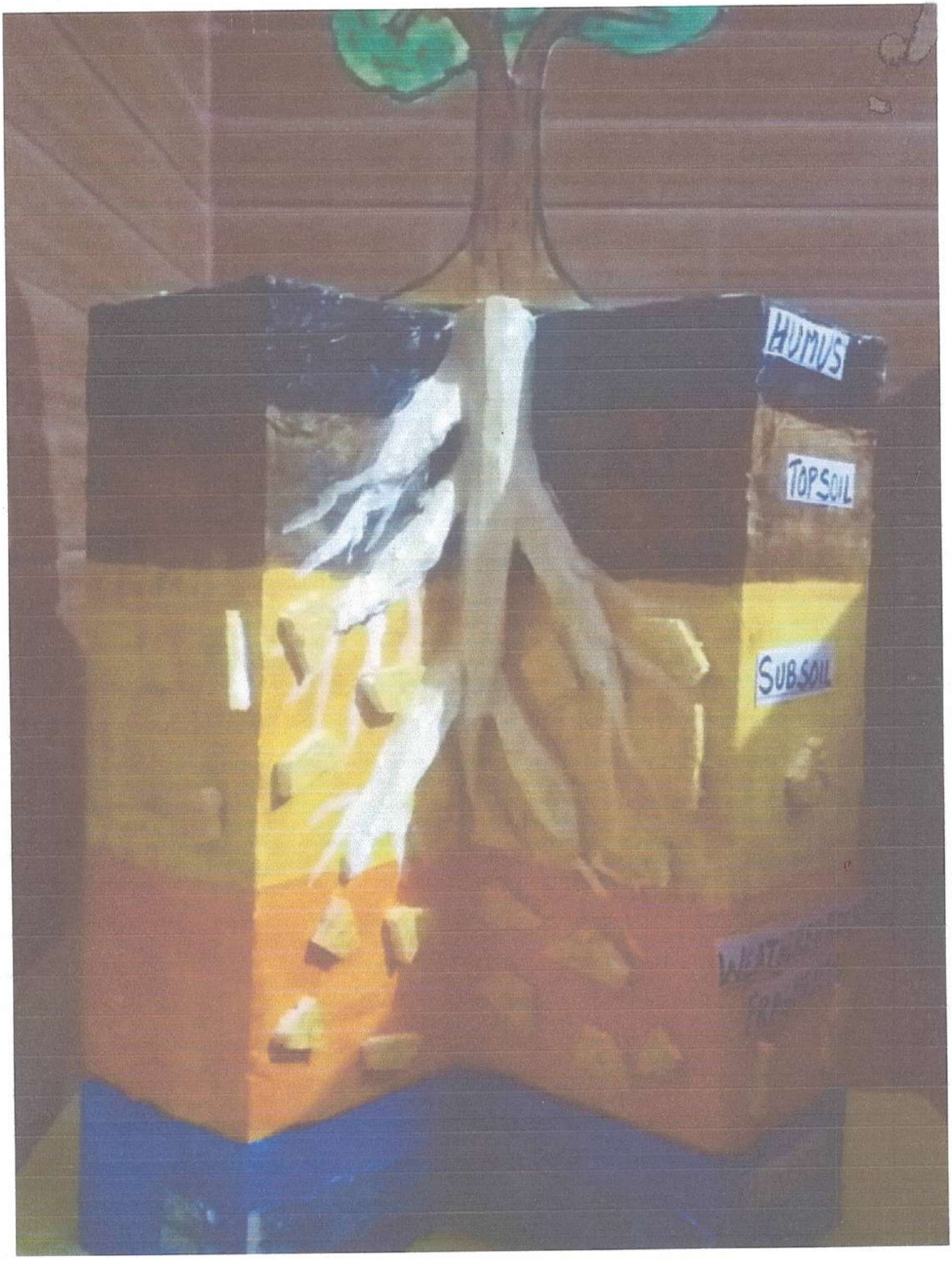
Section – MEDICAL

ROLLNO – 306

H.O.D

Principal
Govt. College for Women
Parade, Jammu

Q9.



Department of Botany

Govt. College for Women, Parade Ground, Jammu

Minor Practical Project

Name of the student: Tanisha Verma

Academic programme pursuing: B.Sc Med

Semester: 3rd

Class roll no.: 97

Registration no.: 19GCPA1940

Teacher In-charge of the practical group:

Principal
Govt. College for Women
Parade, Jammu

- Title of the project : Water cycle
- Objective of the project : The water cycle is very important on the planet for movement of water from one place to another. Through this project students will be able to recognize that there is lots of water on Earth, but not much is used for drinking and also, through this project we will be able to learn the process that water goes through across the planet.
- Content involved : It involves Evaporation, Transpi-ration, Condensation, Precipitation & Percolation.
- Materials required : Cardboard, Chart paper, Colours, Gum, Pencil, Eraser, Sharpner, scissors etc.
- Brief description of project with resource of input from : Books, Internet.
- Observations : We observed that water cycle is a continuous process of Evaporation, condensation, precipitation & Percolation.
- Conclusions drawn : The conclusion was that

the same water is used again and again with every cycle. There is no loss or gain of water, but the drinking water on Earth is present in very less amount.

- Precautions followed: Put your chart paper on flat surface
  - Don't overdo things.
  - While using scissors, work carefully.
- Attach Photographs of project framed: Framed those on the chart paper.
- Remarks about the project, that how it has generated your interest in the subject: The project of water cycle is very interesting as through this we will know that how our Earth is getting its whole water back but very less for drinking. By Educating ourselves on this topic. We'll educate others too.
- Which other projects you are interested in:

→ Soil profile
→ Xerosere
→ Hydrosere
→ Seed dispersal

11.0.17

Department of Botany (GCW Parade, Jammu)
Minor Practical Project

Name of Student : Taniya Devi
Academic Programme Pursing BSC medical
Semester III rd
Roll no 28
Registration No : 19GCPA1251
Teacher Incharge of Practical group

1. Title of the Project : 3d model of life form
2. Objective of Project : In this we understand the classification of lifeform given Raunkiaer.
3. Context involved : In this the position & degree of protection to perennating buds. during adverse condition.
4. Material required : Thermacol, tap, Jute rope, cutter, Stone, sketch black pen etc.
5. Brief discription of Project with resource of inputs from (Books, internet consultation & Experts - literature pursued) youtube, google etc.
6. Observation : Five forms ① Phanerophytes ② Chamae phyte ③ Hemi cryptophytes ④ Geophytes, ⑤ Therophytes
7. Conclusion drawn : Five forms given by Raunkiaer
8. Precaution : Hande cutter carefully
Cut paper in Symmetry

Name → TAMANA SHARMA
Semester → Bsc III Sem Medi-cal
Class Rollno → 31

Registration No.........................
Teacher In charge of the practical Group ....

1. Title of the Project:- Seed Dispersal by Water & Animal
2. Objectives of the Project:- To study the concept of seed dispersal by water and animals.
3. Context involved:-
4. Materials required for the project:- Hard Board, Colours, Thermacoal Plants, fevicol, Black Marker, Scissor, white sheet.
5. Brief description of the project with resource of Inputs from (Books, internet, Consultations with teachers and Experts-Literature Perused)
6. Observations:- Seed dispersal is the movement, spread or transport of seeds away from the Parent Plant.
7. Conclusions Drawn:- Through this model we know that how seeds are dispersed by different mecha-nisms.
8. Precautions Followed:- It should be clear and neat and clean.
9. Attach Photographs of the project framed:-
10. Remarks about the project, that How it has generated your interest in the subject.:-

11.) Which other Project/s you are interested in
A) Solar System c) Soil profile

Name – Muskan Bhagat
Semester – 3rd B.Sc Medical
Class Roll No. – 117

Registration No. 19GCPA2154
Teacher In charge of the practical Group Hilal Qazi Sir.

1. Title of the Project:- ECOLOGICAL PYRAMID
2. Objectives of the Project:- To study the concept of Ecological Pyramids.
3. Context involved:-
4. Materials required for the project:- Hard Board, Thermacol, Black Marker, Card Board, Sticks, White sheet, Fevicol, Black tape, Colours, Scissor, Cutter.
5. Brief description of the project with resource of inputs from (Books, internet, Consultations with teachers and Experts- Literature Perused)
6. Observations:- Graphical representation of Ecological Pyramid.
7. Conclusions Drawn:- It gives information about the trophic site. & also provides a framework or the study of the ecosystem.
8. Precautions Followed:- It should be neat and clean
9. Attach Photographs of the project framed:-
10. Remarks about the project, that How it has generated your interest in the subject.:-

(11) Which othe Project/s you are interested in.
–Water Cycle

Department of Botany.

Govt. College for Women, Parade Ground, Jammu

Minor Practical Project.

Name of the Student. Rashmi Langeh.

Accademic Programme Pursuing.

Semester 3rd.

class rollno. 52

Registration No. 19GCPA1517.

Teacher Incharge of the Practical group Hilal Sir

Title of Project Shape of Leaf.

Department of Botany
Govt. College for Women Parade
Minor Practical Project.

Name: Muskan Sharma

Academic programme prsing: B.SC (2020-21)

Semester: 3rd

Class Roll no: 115

Registration No: 19GCP2130

Teacher Incharge:

1. Tittle for project: Grazing food chain.
2. objective of the project:— one organisms depend upon the other.
3. Material required: chart paper, colourpen, gluee, tape, white page, thermocoal.

Signature: Muskan Sharma

MINOR PRACTICAL PROJECT

Name of the Student - Tashi Chuskit
Academic Programme Pursuing - 2020 - 2021
Semester - 3rd Semester
Class Roll No - 110
Registration NO. - 19GCPA2031
Teacher in charge of the practical Group - Tahira Mam

1. Title of the Project - Epidermal modification in plant (trichomes and Stomata)
2. Objectives of the Project -
3. Contexr involved -
4. Materials required for the project - Thermacol, water colour, chart, gum.
5. Brief description of the project with resource of Input from (Books, internet, consultation with teachers and Experts - Literature Persused) - Internet and Books.
6. Observation -
7. Conclusions Drawn -
8. Precautions followed
9. Attached photographs of project Framed -
10. Remarked about the project How it is generated your interested in the project

Department of Botany

Govt. College for women, Parade Ground, Jammu.

Minor Practical Project

Name of the Student - Harmanjeet Kour

Academic programme Pursuing - B.Sc

Semester - III[rd]

Class rollno. - 55

Registration No - 19GCPA1557

Teacher Incharge of the Practical Group - Hilal Sir

1. Tittle of the Project - Grazing food chain.

2. Objectives of the Project - To study the concept of grazing food chain.

3. Context Involved: The flow of energy and food in an ecosystem.

4. Material required for the Project - Thermocoal, Board, Drawing board, tape, Colours, Chart, glue, pen, pencil, Hot glue gun, Scissors etc.

5. Brief discription of the Project with resource of Inputs from (Books, Internet, Consultations with teachers and Experts literature Perused) - Books

6. Observations: How food and energy moves/passes from one trophic level to another.

7. Conclusions Drawn:

Food and Energy Flow in ~~a~~ grass land.

Department of Botany

Govt. College For Women Parade

Minor Practical Project

Name - Aabdha Mubeen

Academic Programme Pursing - B.S.c (2020-21)

Semester - 3rd

Class Roll No - 159

Registration No - 19GCPA2439

Teacher Incharge -

Title of the Project : Soil Profile

objectives of the Project :

- Soils are the Porous natural bodies composed of inorganic and organic matter.

- They are Formed by the interaction of the earth's crust with atmospheric and biological influences.

- To understand the occurance and distribution of various layers in Soil Profile and their importance.

Context Involved: The soil is arranged in layers or horizons during its formation. These layers or horizons are Known as the Soil Profile. It is the vartical Section of the [illegible] by a Soil Pit.

Material Required For the Project: Cardboard box, scrap book Pages, Pencil, eraser, Colours, etc.

Project Resources: I have use internet in this Project and teacher Consultation.

- Firstly I have Summarize the the Project Means explaning Soil Profile.
- A Soil Profile is a Vertical Cross-Section of the Soil, made of layers running Parallel to the Surface. These layers are Known as Soil horizons.

Observation: Soil Profile for observation should be vertical and make Some Steps on the opposite Side of the Profile.

Soils dug out from the Pit should be Placed on Plastic sheets aside a Pit.

Soils of surface layer Should be Placed Separately. Do not Place the soil above the Soil Profile.

Conclusion Drawn: By examining a Soil Profile, we Can gain a Valuable insight into Soil fertility. As the Soil weathers and organic matter decomposes, the profile of the Soil Changes. For instance, a highly weathered infertile Soil usually contains a light coloured layer in the Subsurface Soil from which nutrients have leached away.

) Precautions Followed:

1) Build the Cardboard box Carefully.

2) Cover the box with ~~co~~ different layers of soil

) Project Interest: This Project is very interesting A Soil Profile descriptions forms the basis of understanding.

) Which other Project / are interested in:

1) Green House Effect

3) Water Cycle

) Carbon cycle

I also interested in water cycle

Department of Botany

GOVT College for Women, Parade

Minor practical project

Name: Reetika

Academic programme pursuing: B.S.C (2020-21)

Semester : 3rd

Clas roll no : 10th

Registration no : 19GCPA1015

Teacher Incharge :

1) Title of the project : FOOD CHAIN

2) Objectives of the project : i) To understand the Connection with in a food chain as well as how Producers and Consumers interact for Energy flow through an Ecosystem.

2) Identify and define the role of organisms with in a food chain.

3) They will explore how humans disrupt Natural food chain.

) Context Involved : A food chain is a linear sequence of of organism through which nutrients and energy pass as one organism eats another." "In a food chain, each organism, each organism occupies a different trophic level define by how many energy transfer separate it from the basic input of the chain."

) Material Required for the Project : A Thermocol, White chart, Green chart, Pencil, Erasers, Colours etc.

5) Project Resources : I have use internet in this project And Teacher Consultation.

1) Firstly I have summarizing the project Means explaning the ~~Aims~~ food chain through Trophic level and Energy flow through internet help.

2) Draw the Model easily and Carefully through Internet help.

) Observation : When observing a single food chain, I can see the path in which energy and nutrients get passed along through a specific Community.

Since a food chain is Much more simplistic then a food web, it can be used to predict the respone of an ecosystem due to changes in population of a single species.

7) Conclusion Drawn : Firstly ~~draw~~ use thermocol. A thermocol Covered with a green sheet and draw a sequence

Food chain. Firstly Sunlight ray pass the Maize plant (Corn) i.e producer and Mouse eat a Maize (Consumer) Snake eat a Mouse (a Carnivores) and then Owl attack a Snake (Top Carnivore). this is the Conclusion of the project.

8) Precautions followed: 1) Handle the thermocol carefully.
2) Drawing should be neat and clean.

9) Project Interest: This project is very interesting. A Food Chain Project is very simple and interesting.

- They show how energy and Material are transfered b/w trophic level when Consumer eat producer or other organism.

10) Which other project / are interested in.
A) A Soil profile
B) Water cycle
C) Carbon cycle.
I also Intersted in Water cycle.

Sign [signature]

Name → Poonam Ranyal
Academic programme pursuing - B.S.C
Sem - IIIrd
Class roll no. → 102
Registration no. → 19GCPA1966
Teacher Incharge - Hilal Sir

Title of the Project - Ecological Pyramids

Objectives → To study the concept of Ecological Pyramids.

Materials req. → Thermocol, Board, tape, Colours, Chart glue, pen, pencil, scissors etc.

Context Involved:

Brief description for the project with resource of Inputs from [Books, Internet, consultation with teachers.

Observations → Graphical representation of Ecological pyramids.

Conclusion → It gives information about the trophic str. & also provides a framework on the study of the ecosystem.

Precaution → It should be neat & clean
It should be attractive.

Attach photographs of the project framed:

Tittle of the ProJect : Detritius food Chain

ObJectives of the ProJect : How Organisms depend on each other.

Context involved:

Material required for the ProJect : Thermocol, Water colours, marker, cardboard, glue, Cutter and Paper.

Brief description of the ProJect With resource of inPuts:
from nets and books

Source of inPut - Internet

Observations: Food cycle of organisms

Conclusion drawn: stability maintain on food chain as well as for the environment.

Precautions followed: A being careful While using cutting tools. wash your hands because dirt and oil begins to accumulate on hand while Preparing the model.

Attach ~~ProJect~~ Photographs of ProJect farmed -(on first Page)

Remarks about the ProJect. How it has generated your interest in the subJect : While doing the ProJect, a learned a lot more about the topic and its significance in science field.

Which other ProJect/s, you are interested in :

1. Collection of monocot Plant species in your area
2. Water cycle
3. Study of leaf shape diversity.

Ambika sharma
Signature of student

MINOR PRACTICAL PROJECT

Name of the Student - CHUSKIT Angmo
Academic Programme Pursuing - 2020 - 2021
Semester - 3rd Semester
Class Roll No - 344
Registration No. - 19GCPA2705
Teacher in charge of the practical Group - Hilal Sir

1. Title of the Project - Carbon cycle

2. Objectives of the Project -

3. Context involved -

4. Materials required for the project - Thermacol, water colour, chart, gum.

5. Brief description of the project with resource of Input from (Books, internet, Consultations with teachers and Experts - literature Perused) - Internet

6. Observation -

7 - Conclusions Drawn -

8. Preccautions Followed -

9. Attached Photographs of project framed -

10- Remarked about the project. How it is generated into your interested in the project -

Govt. College for Women, Parade Ground, Jammu.

Minor Practical Project

Name of the Student — Preeti sharma

Academic Programme Pursuing — Bsc. Medical

Semester — 3rd

Class roll no. — 177

Registration no. — 19GCPA2567

Teacher incharge of the Practical Group ________

1. Title of the Project :- Ecological Pyramid.

2. objectives of the Project :-

3. Content involved :-

4. Material required for the Project :- Thermocol, chart, colour, Gum, etc.

5. Brief discription of the projectio with resource of inputs from Books, Internet, consultation with teachers and experts - literature Perused].

6. observation.

7. Conclusion Drawn :-

8. Precautions followed:-

9 Attach Photographs of the project framed.

10. Remarks about the Project, that how it has generated your interest in the subject:-

11. which other Project/s you are interested in.

A) Water cycle.

B) Carbon cycle.

C) ______

MINOR PRACTICAL PROJECT

Name of the student :- GAYATHRI . L
Academic Programme Pursuing :- B.Sc (Medical)
Semester :- 3rd.
Class Roll No :- 308
Registration No :- 19GCPA3256.
Teacher In Charge of the Practical Group :- Dr. Hilal Qazi

1. Title of the Project :- ECOLOGICAL PYRAMID.
2. Objectives of the Project :- To learn to display the concept of ecological pyramid through a model. To study how different types of ecological pyramids are formed in different environment and ecosystem.
3. Context Involved :- Ecological Pyramids are the best way to study ~~diff~~ relation of various parameters with respect to different trophic levels of an ecosystem. Charles Elton in the year 1927 started the idea of ecological pyramids. Hence this graphical representation is also known as Eltonian pyramids. The parameter that divides the Ecological Pyramid into three types are number, biomass and energy resulting in Pyramid of Number, Pyramid of Biomass and Pyramid of Energy. The shape of Pyramid of Number and Pyramid of Biomass may be upright (or) inverted depending upon the ecosystem. In contrast to this, the Pyramid of Energy is always upright in shape.
4. Materials Required for the Project :- Cardboard, A-4 size papers, coloured craft papers, gluestick, cello tape, sketch pens.
5. Brief Description of the Project :- The Project model shows the Ecological Pyramids (Pyramid of Number, Pyramid of

represent the bulk of food are at the base of ecological pyramid. In case of contracting pyramid, organisms feeding on this base are generally fewer in number, smaller in gross mass and occupy succeeding place. At each successive level, the organisms are generally, fewer in number. smaller in gross weight but larger in size. This way, it forms a pyramid shape which contracts and acquires its apex.

6. Observations :- The following observations can be derived out from the ecological pyramid model.

- Pyramid of Number depicts to arrangement of number of individuals of different trophic levels in a food chain. It may be upright (predatory food chain of grassland) (or) inverted (parasitic food chain). Sometimes, it also forms a spindle shape (◇).
- Pyramid of Biomass represents the biomass (total amount of living (or) organic matter in an ecosystem) present per unit area in different trophic levels. It may be upright (grassland ecosystem) or inverted (pond ecosystem)
- Pyramid of Energy represents the amount of accumulated energy per unit area in different trophic levels. There is a gradual decrease in energy at successive trophic levels. Therefore, the pyramid of energy are always upright. The energy is highest at the producer level.

7. Conclusions Drawn :- • Ecological Pyramids are of three types, namely, Pyramid of Number, Pyramid of Biomass and Pyramid of Energy.

- The graphical representation can take different pyramid shape (upright (or) inverted)
- Ecological pyramids are the best way to study the different trophic level relation in a food chain based on different parameters.

Govt. College for Women, Parade Ground.

Jammu.

Minor Practical Project

- Name of the student Anchal.
- Academic Programme Pursuing B.Sc Medical
- Semester 2nd.
- Class roll no 18
- Registeration No 21GCPA1018
- Teacher in charge of the practical Group

Prof. Tahira Firdous

Principal
Govt. College for Women
Parade, Jammu

H.O.D

Govt. College for Women Parade Ground Jammu

NAME OF The Student - ANKITA MANHAS

Academic programme Persuing - BSC Medical

Semester - 2nd

Class roll no - 37

Registration No - 21GCPA1037

Teacher in charge of the practical group - Prof. Tahira Firdous

Principal
Govt. College for Women
Parade, Jammu

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Govt. College for Women, Parade Ground,

Jammu.

Minor Practical Project

\# Name of the student Deepali Chandail

\# Academic Programme Pursuing B.sc Medical

\# Semester 2nd

\# Class roll No. 106

\# Registration No. 21GCPA1106

\# Teacher in charge of the practical Group

Prof. Tahira Firdous

4.0.0

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Govt. College for Women
Parade, Jammu

Govt. College for Women, Parade Ground Jammu.

Minor Practical Project

- Name of the student Janvi Mangotra
- Academic Programme Pursing B.Sc Medical.

Semester 2nd

Class roll no. 145

Registeration No. 21GCPA1145

Teacher in charge of the practical Group

Prof. Tahira Firdous

Principal
Govt. College for Women
Parade, Jammu

H.O.D

DEPARTMENT OF BOTANY
GOVT. COLLEGE FOR WOMEN PARADE GROUND

Name of student : Bhavi Khajuria
Academic Programme Pursuing: BSc medical
Semester : 3rd
Class Roll no. : 301
Registration No : 20GCPA2656
Teacher In charge of the practical Group : DR. Ashaq Sir & Dr. Naseer Sir

- Title of the Project :- Process of Soil Formation .

- Objective of the project :- we got to know that how the soil is formed by different physiological condition like lichens , storms , water currents etc.

- Material Required :- Rock , soil , Favourable climatic condition

- Description of the project :- Soil minerals form the basis of soil. **They are produced from rocks (parent material) through the processes of weathering and natural erosion.** Water, wind, temperature change, gravity, chemical interaction, living organisms and pressure differences all help break down parent material.

- Observation :- Soil formation **begins with the physical and chemical breakdown of the earth's rocks, caused by atmospheric agents.** These processes, known as weathering, chip away rock fragments and thus modify its inherent physical and chemical characteristics.

- Conclusion : - **Climate influences soil formation by providing moisture and heat necessary for the weathering of parent material.** Water dissolves soluble materials and transfers nutrients to the lower parts of the soil.

- Precaution Followed :- 1. We should wear shoes .

  2. Hand should be covered with gloves.

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Govt. College for Women
Parade, Jammu

H.O.D

3. Face should be cover with proper face mask

4. Should not touch anything with bare hand .

- Photograph :-

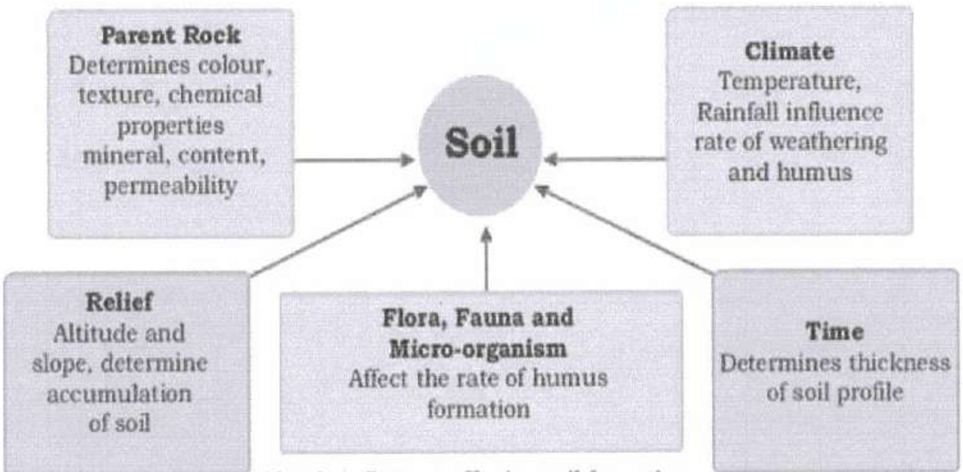

Fig. 2.4: Factors affecting soil formation

- . Declaration:-

The information provided is true to best of my knowledge and precise observation of the physicochemical parameters studied at the visiting site.

Signature of Student

H.O.D

Govt. College For Women, Parade Ground Jammu.

MINOR PROJECT WORK

→ Name of the Student: Aayushi Sharma

→ Academic Programme Pursuing:

→ Semester : Bsc. 2nd Sem

Principal
Govt. College for Women
Parade, Jammu

→ Class roll no: 313

→ Regestration No: 21GCPA1217

→ Teacher In-charge of the practical Group. Dr. Muzaffer Akbar

→ Title of the Project : Life cycle of Morchella

→ Objective of the project: After doing this project, I came to know about the life cycle of Morchella, how they grow and reproduce.

→ Material required for the project: Thermocol sheet, coloured pen, eraser, pencil, scissor, tape, glue stick etc.

→ Brief description of the project with resources of Inputs from Book, Internet, Consulations with teacher.

H.O.D

This life cycle start with the fruiting body, ascocarp or ascoma. Each ascus produces eight ascospores. Ascopores are released for dispersion. Under certain conditions, ascospore can grow & germinate to form a hypha. These hyphya can continue to grow and form primary mycelium. There are two pathways that is primary mycelium. may go through. One is primary mycelium may produce conidia. The other ~~one~~ one is that primary mycelium can continue growing, interwining & develop into a compact masses, which will give rise to sclerotia.

However, it is not clear that whether the sclerotia produced from the primary mycelium can be develop into fruiting bodies directly. And also it is still unknown whether the secondary mycelium is able to develop into a fruiting body or not.

~ * ~ * ~

7. Conclusion:->

TMV cause significant damage to economically important crops such as tomato. There are approximately 450 species of pathogenic plant viruses and many are responsible for huge losses in crop production.

8. Precautions:->

-> All material should be carefully cut and attached.
-> Detailling should be drawn beautifully.
-> Pista shells are tightly attached for making Capsomeres.

9. Remarking:->

This project is really amazing and I really enjoyed it while making it. And I learn so many things about it.

10. Some other projects in which I interests:->

-> Model of Plant Cell.
-> Model of Chloroplast.
-> Model of Mitochondria.

PROJECT OF BOTANY

- Name ⇒ Smriti Sharma
- Academic Program Pursuing ⇒ 2020-21.
- Semester Ist ⇒ Bsc. Sem Ist.
- Roll no. ⇒ 20.
- Registration no. ⇒ N1510446OO44.

1. Title of the Project ⇒ "Tobacco Mosaic Virus" (TMV).

2. Objectives of project :⇒

- To make them aware of this topic which is helpful for them in future.
- Demonstrate the personal abilities and stuffs req. to produce and tnt on extended work.

TMV is a positive-sense single stranded RNA virus species in the genus Tobamovirus that infects a wide range of plants, especially tobacco and other families of Solanaceae.

Classification

- (unranked): → Virus
- Realm → Riboviria
- Kingdom → Orthornavirae
- Phylum → Kitrinoviricota.
- Class → Alsuviricetes.
- Order → Martellivirales.
- Family → Virgaviridae
- Genus → Tobamovirus.
- Species → Tobacco Mosaic Virus.

H.O.D

Date : Page :

Topic :

PRECAUTIONS FOLLOWED :-

- => Dry the plant part thoroughly.
- => While pasting the plant on herbarium sheet make sure the plant dosen't break or fold.
- => Paste the plant in such way that each part is easily visible.

REMARKS :-

I've always been a great observer and admirer of this wonderful world we live in. This project added fuel to my curosity. I'm keen to learn more about the plants around us and about their amazing qualities.

OTHER PROJECTS I AM INTERESTED IN :-

- => Project on seed germination
- => Collection of Algae species.

SIGNATURE OF STUDENT

Srai

Student Name SUKRITI RAI "354"

Subject BOTANY Class 1st Sem B.Sc

School / College Name GIOVT COLLEGE FOR WOMEN PARADE

CONTENTS

Date	Particulars	Date of Submission	Marks Obtained	Remark / Signature
12 feb 2021	Collection OF MEDICINAL PLANTS...	15 feb 2021		

Principal
Govt. College for Women
Parade, Jammu

CERTIFICATE

This is to certify that Smt. / Sri SUKRITI RAI "354" has satisfactorily completed the course of Assignment prescribed by the BOTANY DEPARTMENT in the Year 2020-21

H.O.D

Teacher's Signature

DEPARTMENT OF BOTANY

GOVT COLLEGE OF WOMEN PRADE GROUND

MINOR PRACTICAL

Name of Student : Sukriti Sharma

Acadmic Programme Pursuing :

Semester : Ist

Class roll no : 376

Teacher Incharge of the Practical Group : Dr. Masart Jan

---

1. Title of the project : Collection of some important medical Plant
2. Objective of the project : 1. To Study about the important plants that helps to cure disease and disorders.
   2. To Know their morphological stuture.
   3. To Know their common name and the scientific name so that we can easily recorgnise them.
   4. To Know their important uses.
3. Context Involved : Google, helpline

H.O.D

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Parade, Jammu

4. Material required for the Project : Scrapbook, leaves of Medical plants.

5. Brief Descriptions : In this we have the information about the important medical plant that help us to cure our disease and some kind of infections. In this we can study their sturture, scientific name and their uses.

Remarks about the project, that how it has generated your interest in the subject : It was a very intresting and knowledge providing subject we can learn about many kind of medicnal plant we help us to cure disease and infection without any kind of medication in a natural way and with no side effects. It covery benifical for our health.

GOVT. COLLEGE FOR WOMEN, PARADE GROUND JAMMU

MINOR PRACTICAL PROJECT

NAME OF THE STUDENT SEEMA NAZ.

ACADEMIC PROGRAMME PURSUING - BSC MEDICAL

SEMESTER 2ND

Principal
Govt. College for Women
Parade, Jammu

CLASS ROLL NO: 167

REGISTRATION NO 21GCPA10167

TEACHER IN CHARGE OF THE PRACTICAL GROUP

PROF: TAHIRA FIRDOUS

H.O.D

The broad headings of the formal can be..

Department of Botany

Govt. College for Women, Parade Ground, Jammu.

Minor Practical Project.

Name of the student - Poonam Sharma

Academic Programme Pursuing-

Semester - 2nd / IInd

Class Roll. no. - 44

Regestration No. - 21GCPA1044

Teacher Incharge of the Practical Group.

(Tahira Firdous)

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Govt. College for Women
Parade, Jammu

H.O.D

Department of Botany

Govt. College for Woman, Parade Ground, Jammu

Minor Practical Project.

Name of the Student :- Varsha Sharma.

Academic Programme Pursuing :- BSC

Smester :- 3rd Semester

Class roll No :- 189

Registration No. :- 19 GCPA 2651

Teacher incharge of the Pratical Group :- Dr. Hilal Qazi.

Principal
Govt. College for Women
Parade, Jammu

1. Title of the Project :- Soil Profile.

2. Objectives of the Project :-
Soils are porous natural bodies composed of inorganic and organic matter.
The objective of this lesson is to understand the occurrence and distribution of various layers in soil profile and their importance.

3. Context involved :-
Soil Profile - Soil horizons - All soils have different types of layers - There are different types of soil, each with its own set of charactistics.

4. Material required for Project :-
Hollow box, white chart, green glase paper, artifical trees and plants, water colours, scissor, Fericol, etc.

Department of Botany

Govt. College for Women Parade Ground, Jammu

Minor Practical Project

- ***Name of student*** ***Sana Rafi***

- ***Academic Programme pursuing*** ***B.Sc.***

- ***Semester*** ***IIIrd***

- ***Class Roll no*** ***31***

- ***Registration number*** ***20GCPA2410***

- ***Teacher Incharge of practical group*** ***Dr.Ashaq Sir & Dr.Naseer Sir***

H.O.D

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- **Title of the project : Soil Profile**

- **Objectives of the project :** (I) To Draw Preliminary idea of Soil Profile.
(II) To study variation in Horizons of Soil on the Basis of Rainfall, Climate & Vegetation.

- **Materials required for project :** It was lockdown period, so all references are taken from Internet & Books. Diagrams from Internet, Illustrations as well from same sources. Information from Book "Ecology & Environment by P.D. Sharma", "Modern's book of Botany Sem IV" & Internet.

- **Description of project :** Soil is generally composed of number of parallel layers varying in physical and Chemical properties. Each layer is called Horizon. A basic soil profile is composed of three major Horizons → A, B & C. And sometime on the top O-Horizon composed of Humus. Horizon A is Darker in colour & composed of Organic matter and minerals. Horizon E is generally composed of Sand, silt, Quartz. It is lighter in colour & is also known as Zone of Leaching. Horizon B, also known as Top Sub-soil composed of leached out material from Zone A & E. It may also have Iron, Aluminium & other Soluble Salts. Horizon C consists of parent material. And Horizon R is made up of Bed Rock.

- **Observations :** (1) In Arid regions → Humus is Totally Absent. All soluble minerals accumulate in Horizon-B.

(2) In Semi-Arid Regions → There's Dark Humus, Alkaline & Thick Horizon A.

(3) In Temperate Regions → There's O-Horizon & Most Minerals leach out.

(4) In Tropical Regions → Horizon B is Rich in Iron & Aluminium. All soluble salts leach out to lower Horizons. In Tropical Rainforest, Humus is at some extent negligible, because Climate there favours fast

Govt. College for Women, Parade Ground, Jammu.

Minor Practical Project

Name of the student Anamika Devi.

Academic Programme Pursuing B.Sc Medical.

Semester 2nd.

Class roll No 89.

Registration No 21GCBcu1089

Teacher in charge of the practical Group.

Prof. Tahira Firdous

Principal
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Parade, Jammu

M.O.D

DEPARTMENT OF BOTANY

GOVT. COLLEGE FOR WOMEN, PARADE GROUND, JAMMU

MINOR PRACTICAL PROJECT

Name of the Student: Harleen Kour

Acedemic Programme Pursuing:

Semester: III rd

Class roll no: 228

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Parade, Jammu

Registeration no: 19GCPA2997

Teacher incharge of the practical group:
Prof. Tahira Firdous And Prof. Hilal Qazi.

1. Title of the project: Collection of dicot plant species in our present surrounding.

2. Objectives of the project: collection of dicot plant species in our area and analyse them their leaves arrangement,

Material required for the project, Chart paper, thermocol, ice cream sticks, pen, markers, plants.

Brief description of the project with resources of inputs from (Book, Internet, consultations with teachers and experts - literature perused)

Department of Botany
Govt. College for Women Parade
Minor Practical Project:

lame :- RUHI
cademic Programme Pursing:- B.S.C (2020-2021)
Semester:- 3rd
lass Roll NO. :- 238
egistration NO :- 19GCPA3058
Teacher-Incharge - TAHIRA-firdous-MAM
Title of the Project:- life forms
Objectives of the project :- life purpose consist of the central motivating aims of your life - the reason you get in the morning. Purpose can guide life decisions, influence behaviour, shape goals, offer a sense of direction, and create meaning.

Context Involved :- life, living matter and, as such matter that shows certain attributes that include responsiveness, growth, metabolism, energy transformation, and reproduct-ion.

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Material Required for the Project :- cardboard box, scrab book pages, pencil, eraser, colours etc.

Project Resources :- I have use internet in this project and teacher consulation.

observation :- life - form the structure, form, habitats, and life history of an organisms. In plants, especially character -istic life - forms.

Conclusion Drawn :- Every life processes is very important. They help in the survival of all living organisms. Without these all we can't survive.

DEPARTMENT OF BOTANY

GOVT. COLLEGE FOR WOMEN, PARADE GROUND

MINOR PRACTICAL PROJECT

NAME OF THE STUDENT :→ Kulwinder Kour

ACADEMIC PROGRAMME PERSUING :→ B.Sc. (Medical)

SEMESTER :→ 5th (V)

CLASS ROLL NO. :→ 304

REGISTRATION NO. :→ 19GCPA1696

Teacher Incharge Of The Practical Group :→

Dr. Shagun Bali mam

Principal
Govt. College for Women
Parade, Jammu

Title of the project :→ Any women Scientist (Kamala Sohonie)

Objectives of the project :→ In this project, there is detailed description about kamala Sohonie (women scientist, her achievements, awards, etc

Context involved :→ From net and previous books of botany.

Materials required :→ Chart, a large sized photograph of Scientist, tapes, markers, highlighter, etc.

5. Brief description of the project :→ From net, previous books of Botany, novels, etc.

6. Observations :→ She is the first Indian Biochemist who persued Ph.D in only 14 months to complete it. She discovered proteins in pulses and milk.

7. Conclusion drawn :→ She paved the way for women to get admission at IISC. First Indian women who persued Ph.D and being honored in a ceremony organised by Indian Council of Medical Research.

8. Precautions followed :- i) Pasting of photograph of scientist should be done carefully to avoid its tearing.

2) Remarks about the project how it has generated interest in the subject :-

i) This project provides us knowledge about the Indian women Scientist as a biochemist

ii) She is the first women scientist who discovered the enzyme cytochrome 'c' in electron transport chain.

1) The other project I am interested in :->

A) Chloroplast

B) Transciption

C) Mutation

Signature of the Student :->

Kulwinder Kaur.

DEPARTMENT OF BOTANY

Govt. College for Women, Parade

Name :- Samridhi RajPut

Academic Programme Pursuing :- B.Sc

Semester :- Vth

Class roll no. :- 71

Teacher Incharge :- Dr. Shallu Sambyal

H.O.D

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Govt. College for Women
Parade, Jammu

"Department of Botany."

Govt. College for Women, Parade Ground, Jammu.

"Minor Practical Project"

Name : Japneet Kour

Academic Programme Pursuing : BSc.

Semester : Vth (Medical)

Class Roll no : 81

Registration No : 19GCPA1391

Teacher Incharge of the Practical Group : Dr. Shallu Sambyal.

H.O.D

Principal
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Parade, Jammu

1. Title of the Project :-

Nuclear Pore.

2. Objectives of the Project :-

To Study about the structure of nuclearpore complex.

3. Context involved :-

Nuclear pores are highly complex assembly of proteins. Thousands of them are embedded in the double membrane that surrounds and protects the cell's nucleus. They act as a gateway that regulates the entry and exit of hundreds of thousands of molecule every minute.

4. Materials Required for the Project :-

Thermacol, Chart paper, wooden paper fabric colours, fevicol, cutter, pencils steel wool, straws, wires, tapes, Black tape, stretch rubber, paint brush.

5. Brief description of the Project with resource of input from (Books, internet, consultation with teachers and Experts - (Literature Perused):

Books : 1. Pradeep Botany.
2. Cell Biology and Genetics P. K. Gupta.

internet : Google :- Nuclear pore - Wikipedia
YouTude : YouTude channel :- Genome Academy of Life sciences.

The nuclear pore is a protein - lined channel in the nuclear envelope that regulates the transportation of molecules between the nucleus and the cytoplasm.

In eukaryotic cells, the nucleus is separated from the cytoplasm and surrounded by a nuclear envelope. This envelope safeguards the DNA contained in the nucleus.

6. Observations :

Electron Micrograph of Nuclear Pore complex reveals following structures.

- Nuclear membrane is composed of :
  (i) Ectokaryotheca (outer nuclear membrane)
  (ii) Endokaryotheca (Inner nuclear membrane)
- Perinuclear space is 100-300 A° thick space between nuclear membranes.
- Nuclear Pores perforate the nuclear membrane.
- Each nuclear pore is octagonal in shape, 120nm in diameter and 50nm in thickness.
- The two membranes of the nucleus are continuous at the pores.
- The non - membranous material around the nuclear pore forms the annulus and whole structure is termed as Nuclear Pore Complex (NPC).
- A single nuclear pore complex is composed of

four element :

- Scaffold : a stack of three rings ; a cytoplasmic ring toward the cytoplasm , a nucleoplasmic ring toward the nucleoplasm and a central ring which is present in between the two rings in the centre of nuclear pore .

- Transporter : Consists of two irises of eight arms each and is proteinaceous in nature . It is meant for the transport of RNA and Proteins across the nuclear pore .

- Cytoplasmic element or fibrils : Present towards the cytoplasm . They are short and thick .

- Basket : consisting of eight element which is attached to the inner side of the nuclear membrane and remains suspended in the nucleo--plasm .

7. Conclusions drawn :-

Nuclear Pore complexes (NPCs) are fundamental components of the eukaryotic cell . They perforate the nuclear envelope and serve as highly selective trans--port gates that enable bi-directional macromalecule exchange between the nucleus and cytoplasm .

" I got the known about the best explanations and Knowledge of the nuclearpore ".

10. Remarks about the project that, How it has generated your interest in the subject:

Already opted topic of the subject i.e botany.

11. Which other Project you are interested in:

- DNA (Model).
- Mitosis (Model).
- RNA (Model).

—x—x—x—

DEPARTMENT OF BOTANY

GOVT. COLLEGE FOR WOMEN

PARADE JAMMU.

Minor Practical Project

NAME OF THE STUDENT :→ PALVI DEVI KOTWAL

ACADEMIC PROGRAMME PURSUING :→ B.Sc

SEMESTER :→ 5th

CLASS ROLL NO :→ 01 'odd grp'

REGISTRATION NO :→ 19GCPA1562

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Parade, Jammu

TEACHER INCHARGE :→ Dr. Shallu Sambhyal

TITLE OF THE PROJECT :→ DNA (MODEL)

OBJECTIVES OF THE PROJECT :→ By studying DNA we find out that the Molecular models of DNA structures are representations of the Molecular geometry and topology of deoxyribonucleic acid (DNA) molecules using one of several means, with the aim of simplifying and presenting the essential, physical and chemical, properties of DNA molecular structures either in vivo or in vitro.

CONTEXT INVOLVED :→ DNA is long molecule that contains each person's unique genetic code. It was first discovered by scientists have gained a huge amount of knowledge regarding the structu-re and function of plant DNA, enabling us to make great advances in plant genetics and improvements in food security.

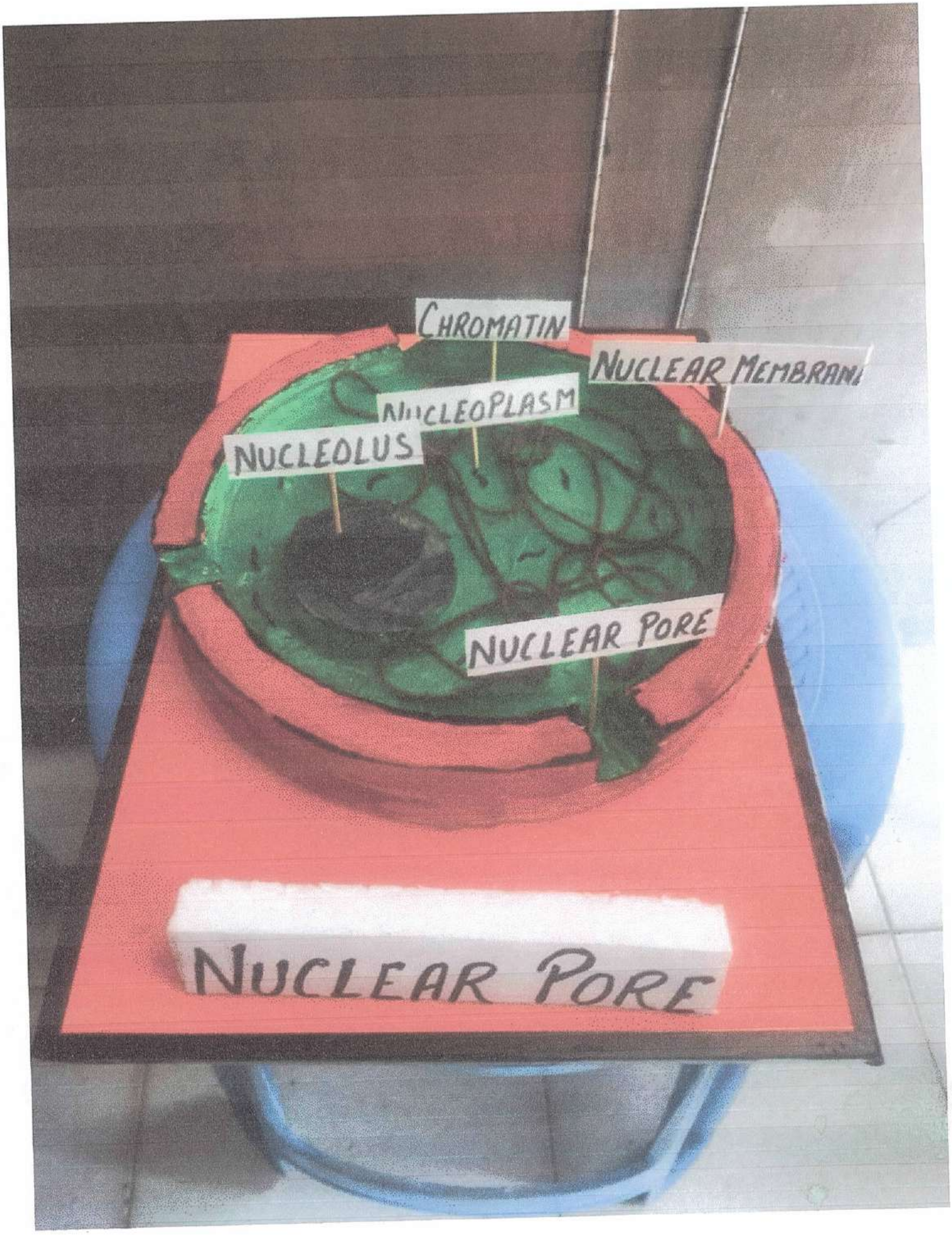
MATERIAL REQUIRED FOR THE PROJECT :→ Thermocol, clay, sticks, wire, chart, Tape.

RESOURCES :→ Internet

DNA → DNA is a two-stranded molecule that appears twisted, giving it a unique shell referred to as the double helix. Each of the two strands is a long sequence of nucleotides of individual unit made of a phosphate molecule, a sugar molecule called deoxyribo containing five carbons and a nitrogen-containing region. There are four types of nitrogen-containing regions called bases.

OBSERVATION :→ We observe that the DNA replication is two DNA molecule consisting of one new and one old chain of nucleotides.

CONCLUSION :-> In conclusion, DNA is very important for life. It can replicate well, which means that the next generation will retain the characteristics of the parents. It is capable of change, which means that it provides for variation and was crucial for evolution to occur.


CHROMATIN
NUCLEAR MEMBRANE
NUCLEOPLASM
NUCLEOLUS
NUCLEAR PORE
NUCLEAR PORE

TOPIC

DATE

WORKING OF LEAD ACID BATTERY

The storage battery or secondary battery is such a battery where electrical energy can be stored as chemical energy and this chemical energy is than converted to electrical energy as and when required. The conversion of electrical energy into chemical energy by applying external electrical source is k/ as charging of battery, whereas conversion of chemical energy into electrical energy for supplying the external load is k/ as discharge of secondary battery. During charging of battery, current is Passed through it which causes some chemical changes inside the battery. This chemical changes absorb energy during their formation.

When the battery is connected to the external load, the chemical changes take place in reverse direction, during which the absorbed energy is released as electrical energy and supplied to the load.

Now we will try to understand the principle working of lead acid

Project/dissertation undertaken by PG students (Home Science CRM& Extension 2020-21)

S.no	Title	Advisor/Guide	Name of the students	Detailed report
1.	Changing lifestyle of women in urban areas during covid-19	Prof. Seema Jolly	Manisha Slani	The study was conducted in urban areas of Jammu division. The women under the age-group of 20-45 years were selected purposively for the study. The study revealed that the respondents were engrossed in their household chores and were more pre-occupied with tasks.
2.	Changing lifestyle of women in rural areas during covid-19	Prof. Seema Jolly	Manesha Devi	The study was conducted in rural areas of Surechak village of Satwari block. The women under the age-group of 20-45 years women were selected purposively for the study. The study revealed that the respondents were busy with their household chores along with rural chores.
3.	Changing lifestyle of Children in rural areas during covid-19	Dr.Anamika Baru	Saima Bashir	The study was conducted in Ramnagar (Nalla Mallian) of Udhampur district, Jammu division. The children with the age-group of 7-12 years of children were selected purposively for the study. The study revealed that they were engrossed with extra-circular activities like playing, eating, revision and keeping up with assignments given by their respective teachers
4.	Changing lifestyle of Children in urban areas during covid-19	Dr.Anamika Baru	Faisa Mehmood	The study was conducted in Jammu division. The children under the age-group of 7-12 years were purposively selected for the study. The study revealed that the children were engrossed with online activities and classes. Their lifestyles were disturbed during covid-19.

HOD

Department of Home Science

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Outline of the Project

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Parade, Jammu

Name : Aliza Tabassum

Class : Bsc 6^{th} sem

Roll No : 5130220

Reg. no : 18GCPA2694

Title of the Project : What are the characteristics of the battery. Discuss the working of lead acid battery.

Batteries

Introduction

An electrochemical cell is a device capable of either generating electrical energy from chemical reactions or using electrical energy to cause chemical reactions. The electrochemicals cells which generate an electric current are called volatic cells or galvanic cells and the other ones are called electrolytic cells which are used to drive chemical reactions like electrolysis. A battery consists of one or more cells, connected either in parallel, series or series-&-parallel pattern.

Classification of Batteries

Electrochemical cells or Batteries are classified into four broad categories. These are primary cell or battery secondary cell or battery, reverse batteries & fuel cells. All of these are discussed below.

(A) Primary cell or battery - A cell or battery that cannot easily be recharged after one use, are discarded following discharge is known as primary cell. Most primary cells utilise electrolytes that are contained within absorbent material or a separator. (i.e.. no free or liquid electrolyte) and are thus termed dry cells, Examples: dry cell, mercury cell, galvanic cell, fuel cell etc.

(B) Secondary Cell or Battery - A cell or battery that can be electrically recharged after use to their original pre-discharge condition by passing current through the circuit in the opposite direction to the current during discharge is known as secondary cell or battery. Examples: Lead acid battery, Lithium ion battery, Ni-cd Battery etc.

Secondary batteries fall into two sub-categories depending on their intended applications:

(a) Cells that are utilised as energy storage device & delivers energy on demand. Such cells are typically connected to primary power source so as to be fully charged on demand. Example of these types of secondary cells include emergency and stand by power source, aircraft system and stationary energy storage system for load leveling.

(b) cells mat are essentially utilised as primary cell, but are recharged after use rather than being discarded examples of these types of secondary cells primarily include portable consumer electronics and electric vehicles.

(C) Reserve cell or battery - The cells or batteries in which the possibilities of self discharging and chemical deterioration are eliminated or minimised are known as reserve batteries what differentiates the reserve cell from primary and secondary cells is a key compound of the cell that isolates same components prior to the activation the compound most often isolated is the electrolyte. This battery structure is commonly observed in thermol batteries whereby the electrolyte remains inactive in a solid state until the melting point of the electrolyte is reached allowing for ionic conduction, thus activating the battery. Reserve batteries effectively eliminate the possibilities of self-discharge and minimise chemical deteriosation

* Reserve cells are typically classified into the four following categories:-

1. Water activated Batteries
2. Electrolyte Activated batteries
3. Gas Activated batteries
4. Heat Activated batteries

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(D) Fuel cell or battery - It represents the fourth category of batteries. Fuel cells are similar to batteries except for the fact that all active materials are not an integral part of the device. (as in the battery). In fuel cells, active materials are fed into batteries from an outside source.

The fuel cells differ from a battery in that it possess the capability to produce electrical energy as long as active materials are fed to the electrodes but stop operating in the absence such materials. A well-known application of fuel cells has been in cryogenic fuels used in space vehicles. use of fuel cell technology for terrestrial applications has been slow to develop. although recent advances have generated a revitalised interest in a variety of systems with applications such as utility power, load dealing on side side generators and electric vehicle

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Characteristics of Battery

* A battery is compound of one or more cells, either parallel or series connected to obtain a required current / voltage capability (Batteries comprised of series connected cells are by far the most common.)

* A battery can be used only once (primary battery) or it can be used again and again after recharging (secondary battery).

* mAh & Ah - The term mAh is an abbrevation for "milliampere hour" and it is a way to express the electrical capacity of smaller batteries with larger batteries, like car Batteries, we usually use ampere hours or Ah. there are 1000 mAh in a single Ah. mAh is calculated by multiplying the amount of time. The battery lasts by the amperes of the discharge.

mAh = time × I Amperes of Discharge current

* ESR (Equivalent Series Resistance) is the internal resistance present in any cells that limits the amount of peak current it can deliver

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* An Amp-hour capacity of a battery (or cell) is its most important figure of merit it is defined as the amount of current that a battery can deliver for 1 hours before the battery voltage reaches the end of life point.

* The "C" rate is a current that is numerically equal to the A hr rating of the cell. charge and discharge currents are typically expressed in fractions or multiplies of the C rate.

* Slow charging "slow" charge is defined as charging current that can be safely applied to a Battery indefinitely without any kind of monitoring or charge termination method (it is sometime reffered to as trickle charging) A typical Ni-cd Battery with will easily tolerate C/10 & some fast charge Ni-cd cells with accept up to C/3.

* Fast charging "fast" charge (usually defined as a 1 hour recharge) requires more complex charging circuitry (again raising the system cost) But gives the customer faster charging time (a very attractive selling point). the typical Ni-cd or Ni-MH fast charger simply pumps currents into the battery, and waits for the battery to signal when damage and user safety hazards, fast-charge system must be designed to accurately monitor battery parameters like cell temperature and voltage.

* Recharge time - The amount of time that the typical consumer finds acceptable for battery recharging is highly variable, and depends on the item being powered.

* The MPV (Mid Point Voltage) is the nominal voltage the cell, and the voltage that is measured when the battery has discharged 50% of its total energy.

* The measured cell voltage of the end of its operating life is called EODV, which stands for end of discharge voltage (some manufacturers refers to this as EOL or end of life voltage.

* The gravimetric energy density of a battery is a measure of how much energy a battery contains in comparison to its weight.

* The volumetric energy density of a battery is a measure of how much energy a battery contains in comparison to its volume.

<u>Peak Current</u> - The maximum current that a battery can deliver is directly dependent on the internal equivalent series resistance (ESR) of the battery. The ~~battery~~ current flowing out of the battery must pass through the ESR, which will reduce the battery terminal voltage by an amount equal to the ESR multiplied times the load current ($V = I \times R$). Most important, the current flowing through the ESR will cause power dissipation within the battery.

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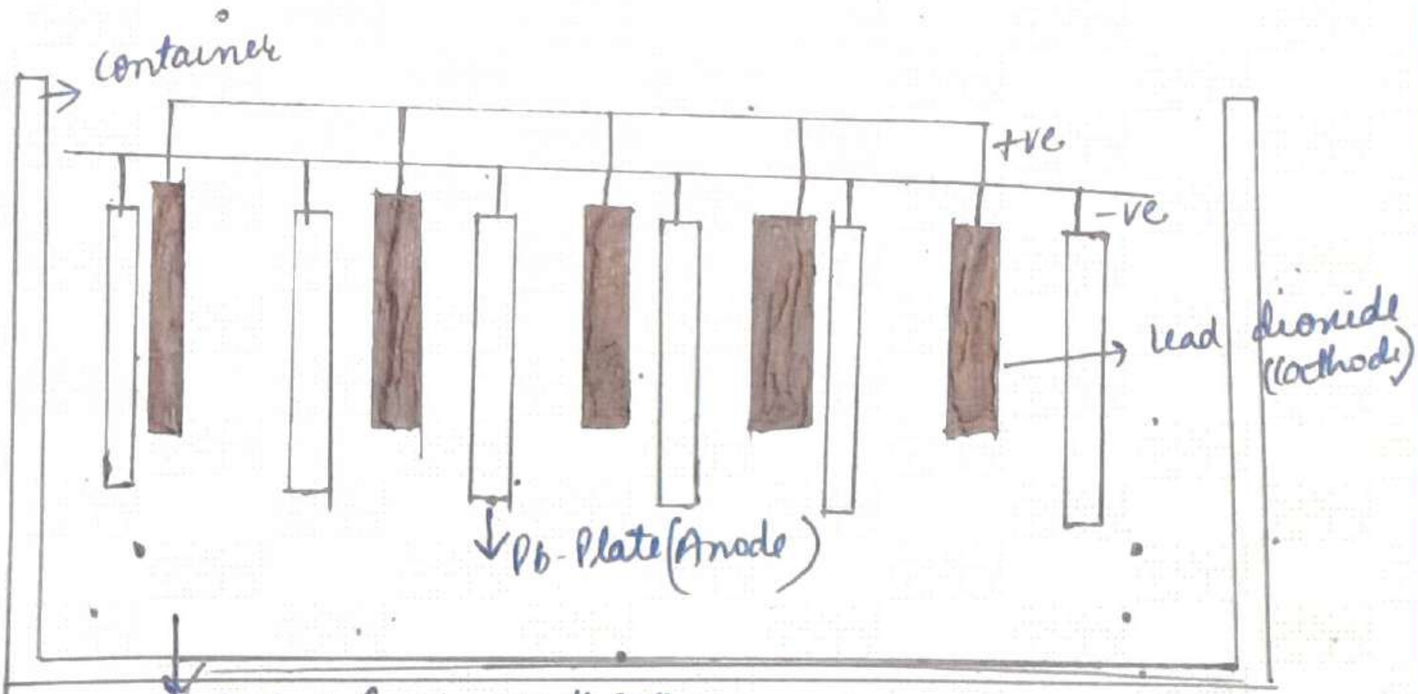
That is equal to the ESR multiplied times the current squared ($P = I^2 \times R$). This can be result in significant heating within the battery at high rates of discharge.

Lead Acid Battery

The battery which uses sponge lead and lead peroxide for the conversion of the chemical energy into electrical power, is called a lead acid is most commonly used in automobiles inverter power station etc. Because it is has higher cell voltage and power cost. It is oldest rechargeable battery and was invented by Gaston Plante in 1859.



[Arrangements of plates in lead acid battery]

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WORKING OF LEAD ACID BATTERIES

The lead acid battery is formed by dipping lead dioxide plate and sponge lead plate in dilute sulphuric acid. A load is connected ~~with~~ internally between these plates. In dil H_2SO_4 the molecules of acid split into positively charged H^+ ions and negatively charged SO_4^{2-} ions. The H^+ ions on reaching PbO_2 plate receive electrons from it and become H atoms, which attack PbO_2, thereby forming PbO & H_2O this PbO reacts with H_2SO_4 & forms $PbSO_4$ & H_2O.

Reaction Involved during discharging

At cathode: $PbO_2 + 2H \rightarrow PbO + H_2O$

$PbO + H_2SO_4 \rightarrow PbSO_4 + H_2O$

$$PbO_2 + H_2SO_4 + 2H \rightarrow PbSO_4 + 2H_2O$$

SO_4^{2-} ions moving freely in the solution, some of them reach at pure pb plate, thereby forming SO_4 & dose two electrons per ion there. Since there would be inequality of electrons betweens these two plates, hence there would be a flow of current through the external load between these two plates.

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At Anode : $Pb(s) + SO_4^{2-}(aq) \rightarrow PbSO_4(s) + 2e^-$

This process is called discharging of lead-acid battery and it leads to the accumulation of $PbSO_4$ and there is fall in the specific gravity of sulphuric acid solution. As a result, the rate of reaction falls due to decrease in the potential difference between the plates.

The battery needs recharging when the density of the H_2SO_4 falls below 1.20 g cm^{-3}. During recharging, the cell is operated like an electrolytic cell. As the density of H_2SO_4 falls but there is still H_2SO_4 existing in the solution on the application of electric current H^+ ions move to the electrode (cathode) connected to negative terminal of the DC source there each H^+ ion takes an electron from that and becomes hydrogen atom. These H-atoms then attack $PbSO_4$ leading to the formation of Pb & H_2SO_4.

$$PbSO_4 + 2H \rightarrow H_2SO_4 + Pb$$

On the hand SO_4^{2-} ions move towards the electrode (anode) connected with the positive terminal of DC source where they will give up their extra electrons and become radical SO_4. The radical SO_4 cannot exist alone and forms PbO_2 & H_2SO_4.

$$PbSO_4 + 2H_2 + SO_4 \rightarrow PbO_2 + 2H_2SO_4$$

DEPARTMENT OF COMPUTER SCIENCE, GCW PARADE, JAMMU

PROJECT DETAILS OF THE STUDENTS OF ACADEMIC SESSION 2020-21

GROUP	NAME OF THE STUDENTS	NAME OF THE PROJECT	PROJECT DESCRIPTION
Group-1	Sakshi,Maneesha,Simran,Stuti, Saloni	**Library Management System**	• Modular approach was discussed thoroughly. • Language to be used for development. • Front-end and back-end services. • Database and server selection. • Connectivity to the Database. • Usability features discussion.
Group-2	Surbhi,Shriya,Harpreet,Shakshi,Vipasha	**Bus booking online system**	• Validation and regular expression specification. • Web security maintenance. • Error handling. • Functionality and Navigation. • Browser compatibility and responsiveness. • Social media integration. • Comprehensive site map.
Group-3	Kajal,Ritika,Rakshita,Aditi,Monika	**Online calendar**	• Front-end and back-end services specification. • Responsiveness and mobile view. • Features discussion. • Event and Reminders. • Navigation and Functionality.

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HEAD (CS)

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Group-4	Sheetal,Upasana,Prakriti Sharma,Rashika,Falgun,Shallu	**Online fee payment system**	• Clean design approach. • Backend services. • Responsiveness and Compatibility (PC and Mobile) • Payment gateway integration. • Navigation and Functionality • Security management.

Rjamwal

(Ms.Roopali Jamwal)

Head(Computer Science)

Principal

Principal
Govt. College for Women
Parade, Jammu

Govt. College for Women Parade Ground, Jammu
(Autonomous College)

Department of Physics

Title of the Project: To compare the momemt of inertia of different Fly-Wheels

Academic Session: 2020-2021

Class/Semester: B.Sc. Semester – I

Project Submitted by:

S. No.	Name of Student	Roll No.
1	Sidra Khatoon	501
2	Shakshi Devi	540
3	Pakshi Dogra	600

Teacher Incharge

HOD
Department of Physics

Head of Department Physics (HOD)
G.C.W. Parade, Jammu

Principal
Govt. College for Women
Parade, Jammu

INDEX:

- ➢ Linear motion & Angular motion
- ➢ Vernier calliper & constant
- ➢ Moment of inertia
- ➢ Radius of gyration
- ➢ Axis of rotation
- ➢ Energy of rotation of a body
- ➢ Fly wheel & its principle

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AIM:

To compare, the moment of inertia of different fly wheels.

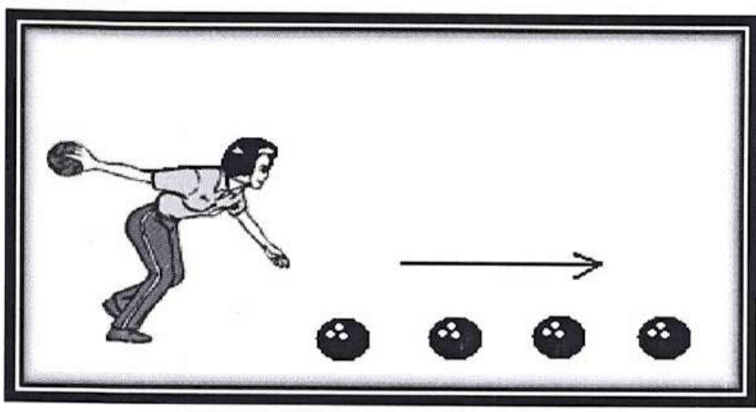
APPARATUS:

- The flywheel
- Weights
- Thread
- Stop-watch
- Metre scale
- Vernier calliper
- Piece of chalk

LINEAR AND ANGULAR MOTION:

Linear motion: (rectilinear motion)

1. It is the motion along a straight line and can therefore be described mathematically using only one spatial dimension.
2. Quantity of matter in a body in linear motion is termed as MASS.
3. Displacement per unit time is known as velocity in linear motion.

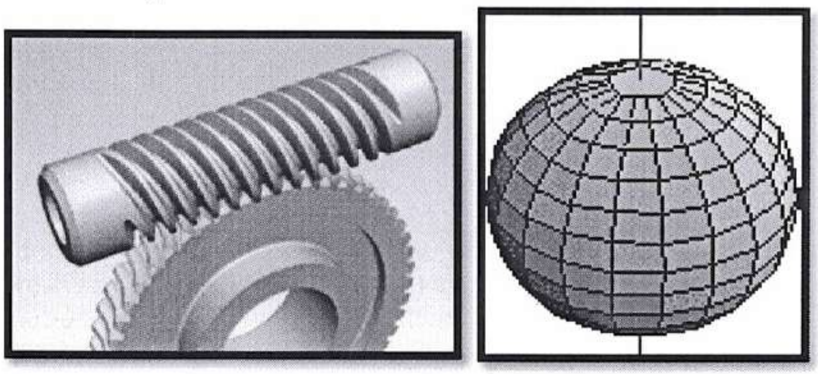

(Linear motion fig.1)

Angular motion: (rotation motion)

1. It is the motion along a circular path and quantity related is known as angular quantity.eg-angular velocity, angular displacement etc.

2. Quantity of matter in a body in angular motion is termed as MOMENT OF INERTIA.

3. Angular displacement per unit time is known as angular velocity.



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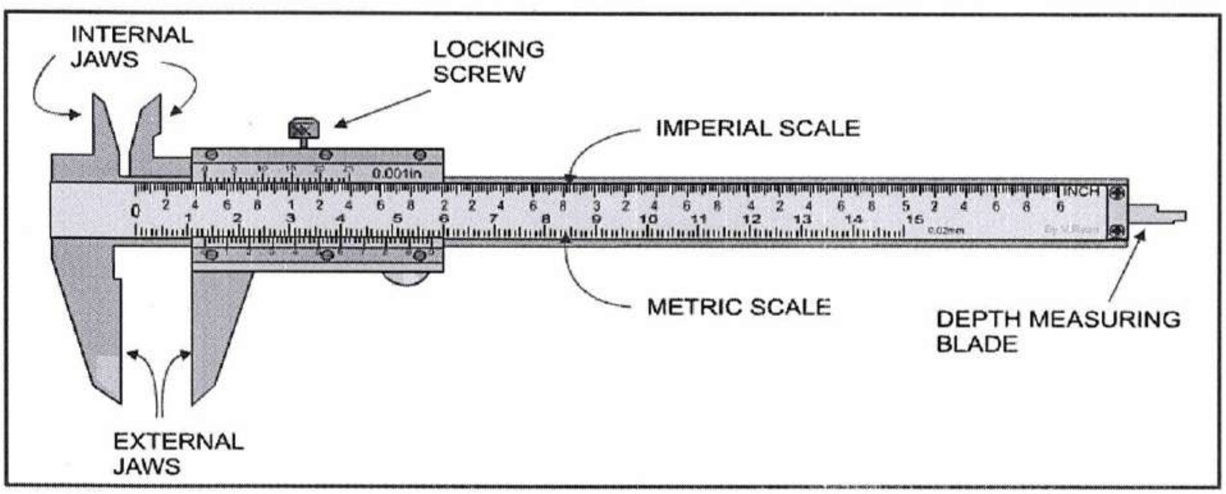

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This instrument is used to measure $1/10^{th}$ or $1/100^{th}$ of a millimetre accurately.

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Moment of inertia, $I=m_1r_1^2+m_2r_2^2+......$

The S.I. unit of M.O.I. is $kg\text{-}m^2$

RADIUS OF GYRATION:

Radius of gyration of a body is a square root of the mean square distance of the particles of the body from the axis of rotation. If the body is divided into n particles each of mass m and they lie at distance r_1, r_2...........from the axis of rotation, then

Radius of gyration(K)=$(r_1^2 + r_2^2+..../n)1/2$

Also, $I=MK^2$

AXIS OF ROTATION:-

If the axis passes through the body's centre of mass, the body is said to rotate upon itself or spin and the axis is said to be the axis ofrotation.

ENERGY OF ROTATION OF A BODY:-

If a body rotates about the axis of rotation with an angular velocity (w), all its particles have the same angular velocity but different linear velocities of the particles of mass m_1, m_2,....from the axis of rotation be v_1, v_2,.....then,

Total K.E. of body= Sum of K.E. possessed by various particles

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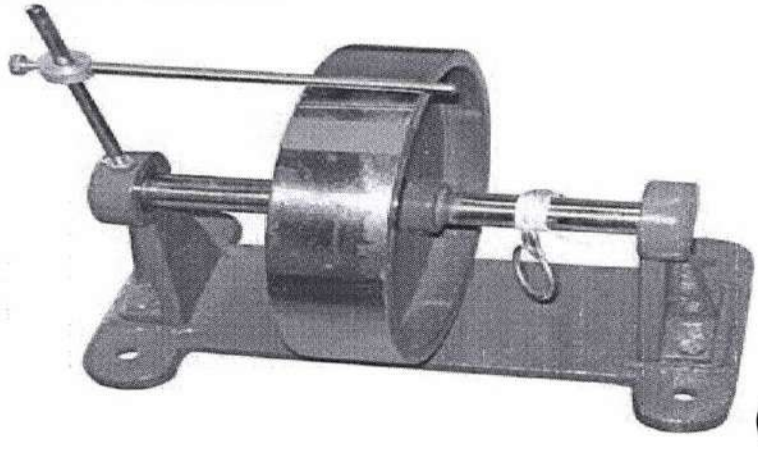

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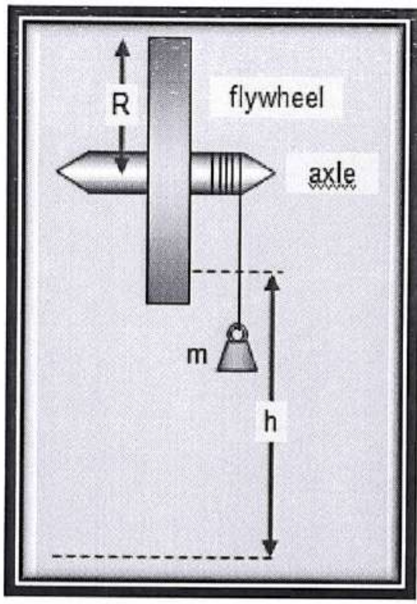

(Fly wheel apparatus fig.5)

One end of the string is in the form of a loop so that it can easily be attached to or detached from a pin projecting from the axle. The length of the string is so adjusted that it gets detached from the axle as soon as the bottom of the mass m is just to touch the floor.

When the mass is allowed to fall, its P.E. is partly converted into the K.E. due to the velocity gained by it and partly into the energy of rotation of the fly-wheel .Let w be the angular velocity, $w=2 \times (2\pi n1)/t=4\pi n_1/t$

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$\rightarrow mgh=1/2mr_2w^2+1/2Iw^2+nF$.........(1)

The kinetic energy possessed by the wheel is used to overcome friction.As the wheel comes to rest aftermaking n_1 revolutions-

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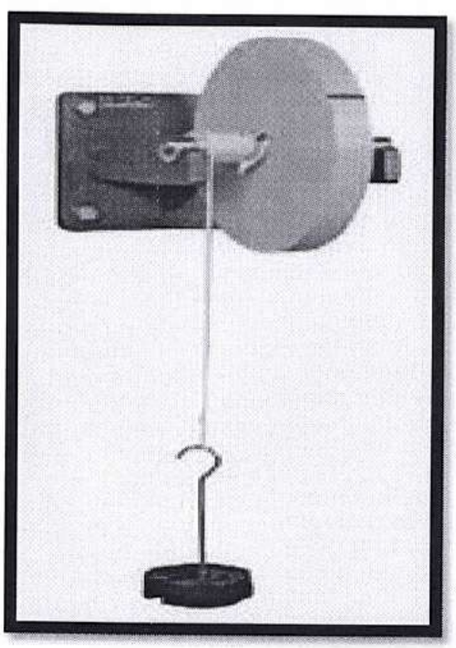
Or,$I=(2mgh-mr^2w^2)/ w^2 (1+n/n_1)$



(Weight attached to a fly wheel fig.6)

PROCEDURE

- Examine the wheel and see that there is least possible friction.Oil the bearings, if necessary.
- Measure the diameter of the axle with a vernier calliper at different points and find the mean. Measure the circumference of the wheel w with a thread.
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- Again note the position of the lower surface of the mass on the scale as at B.If now the mass m is allowed to fall , it will descend through a height BC = h before being detached from the pin A .

- Count the no. of turns wound round the axle and let it be n. The wheel will thus make n revolutions before the thread is detached.
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- Count the no. of revolutions n_1 made by the wheel before coming to rest with reference to the chalk mark and note the time t taken for the purpose.
- To estimate the fraction measure the distance along the circumference by which the chalk mark has advanced beyond the pointer P, by means of a thread.
- Divide this distance by the circumference of the wheel w. Repeat three times for same height and load.
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- Vernier constant=0.01cm=0.001mm
- Diameter of the axle =2.46cm
- Radius of axle=1.23cm
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- Mass attached m_1=50g

- Height of string h =116cm
- No. of turns n= 15

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Mean of n_1= 11.2641

Mean of time=44.33 s

Value of w $=4\pi n_1/t$ =3.1914 rad/s

Using these values in formula;

$I=2mgh-mw^2r^2/ W^2 (1+n/n_1)$

I=(11368000-770.444325)/23.75142

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Mean of n_1=36.82

Mean of time (t)=76.33 s

Value of $w=4\pi n1/t=5.378$rad/s

Using these values in the formula:

$I = 2mgh - mw^2r^2 / W^2 (1+n/n_1)$

$I = 0.054$ kg m^2

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- Diameter of the axle=2.05 cm
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- (S)Circumference of wheel=61cm
- Height of the string(h)=1o2 cm
- Mass attached (m)=50 g
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OBSERVATION TABLE:

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Mean of n_1 =5.9724

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Using these values in the formula:

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Value of $w = 4\pi n_1/t$ = 7.955 rad/s

Using these values in the formula:

$I = (2mgh - mw^2r^2)/\ w^2(1+n/n_1) = 0.018\ kg\ m^2$

PRECAUTIONS:

- ✓ There should be least possible friction in the fly-wheel.The mass tied to the end of the cord should be of such a value that it is able to overcome friction and thus automatically starts falling.
- ✓ The length of the string should be less than the height of the axle of the flywheel from the floor.
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- ✓ The stop-watch should be started just when the string is detached

SOURCE OF ERROR:

- ❖ The angular velocity w has been calculated on the assumption that the friction remains constant when the angular velocity decreases from w to zero.In actual practice this is not the case because the friction increases as the velocity decreases.
- ❖ The instant at which the string is detached cannot be correctly found.

RESULT:

Hence, the moment of inertia of flywheels is dependent on its mass and the axis of rotation.

Govt. College for Women Parade Ground, Jammu
(Autonomous College)

<u>**Department of Physics**</u>

Title of the Project: To compare the momemt of inertia of different Fly-Wheels.

Academic Session: 2020-2021

Class/Semester: B.Sc. Semester – I

Project Submitted by :

S. No.	Name of Student	Roll No.
1	Sonia Sharma	661
2	Simran Dhar	676
3	Ujjwal Gupta	703

Teacher Incharge

Principal
Govt. College for Women
Parade, Jammu

HOD
Department of Physics
Head of Department Physics (HOD)
G.C.W. Parade, Jammu

INDEX:

AIM:

To compare, the moment of inertia of different fly wheels.

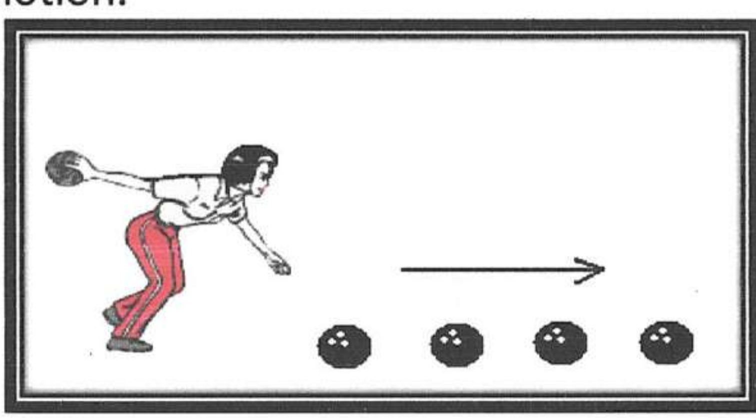
APPARATUS:

- The flywheel
- Weights
- Thread
- Stop-watch
- Metre scale
- Vernier calliper
- Piece of chalk

LINEAR AND ANGULAR MOTION:

Linear motion: (rectilinear motion)

1. It is the motion along a straight line and can therefore be described mathematically using only one spatial dimension.
2. Quantity of matter in a body in linear motion is termed as MASS.
3. Displacement per unit time is known as velocity in linear motion.



(Linear motion fig.1)

Angular motion: (rotation motion)

1. It is the motion along a circular path and quantity related is known as angular quantity.eg-angular velocity, angular displacement etc.
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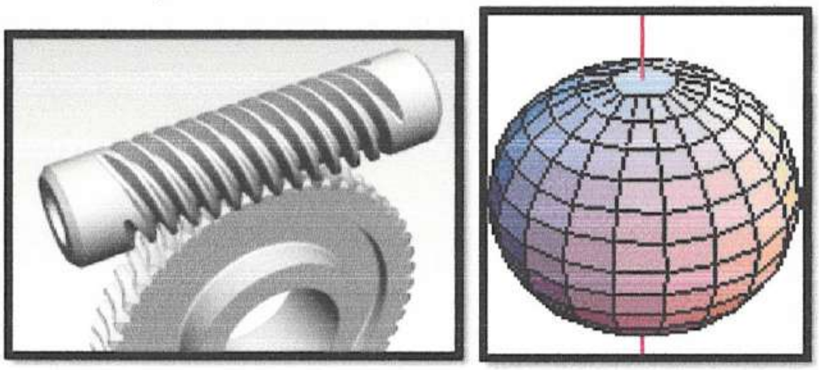

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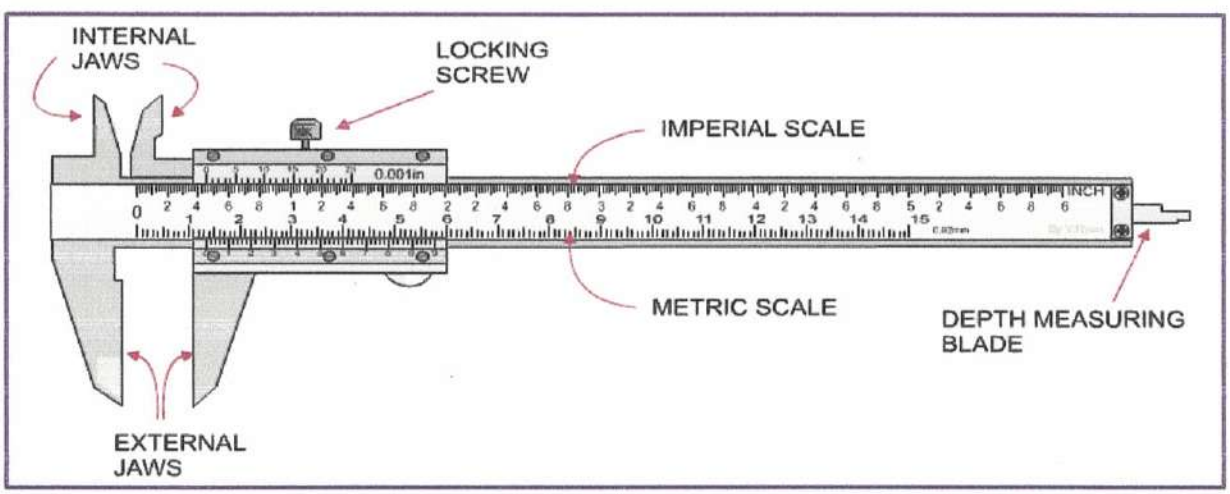

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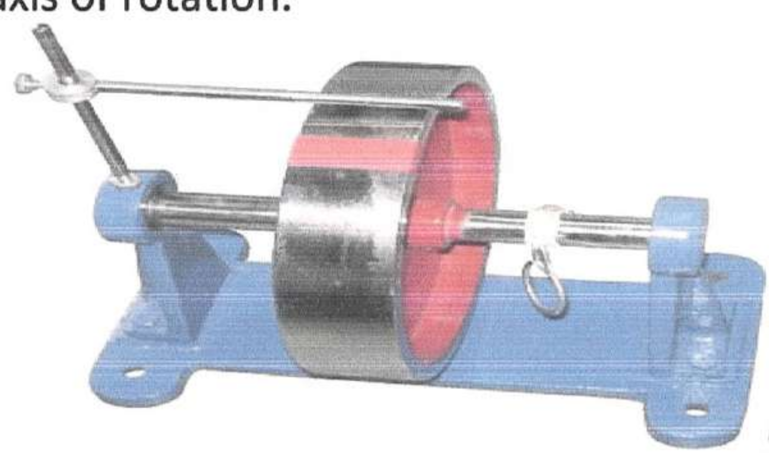

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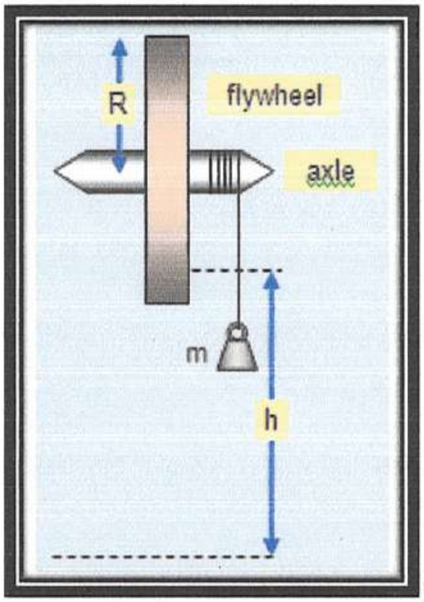

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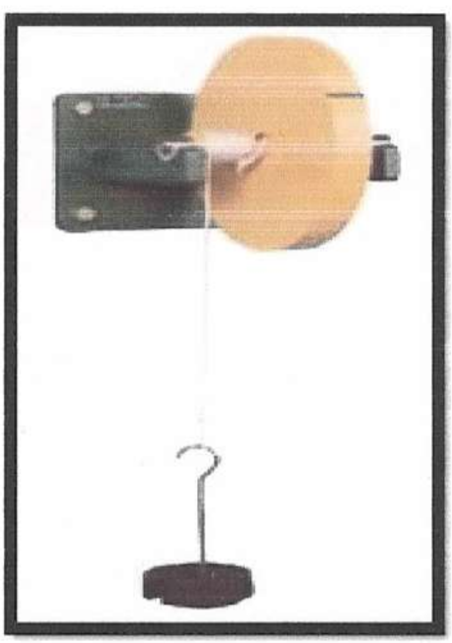

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Govt. College for Women Parade Ground, Jammu
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Department of Physics

Title of the Project: Study of variation of magnetic field of a circular coil with distance

Academic Session: 2020-2021

Class/Semester: B.Sc. Semester - II

Project Submitted by :

S. No.	Name of Student	Roll No.
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2	Pallvi Sharma	574
3	Riya Sharma	602
4	Amisha Sharma	612
5	Priya Thakur	665
6	Bhivushi	701

Teacher Incharge

Principal
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HOD
Department of Physics

Head of Department Physics (HOD)
G.C.W. Parade, Jammu

INDEX

6. Battery Eliminator

7. Magnetometer Compass

8. Magnetic Field Sensor

9. Rotary Motion Sensor

10. Tangent Galvanometer

- **PROCEDURE**

    1. Figure And Circuit Diagram

- **OBSERVATION**

    1. Observation Table

    2. Graph

    3. Result

- **APPLICATIONS**

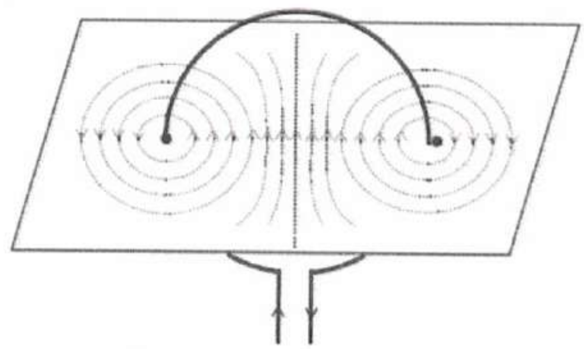
- **PRECAUTIONS**

INTRODUCTION

MAGNETIC FIELD

Magnetic Field is the region around a magnetic material or a moving electric charge within which the force of magnetism acts.

A pictorial representation of the magnetic field which describes how a magnetic force is distributed within and around a magnetic material



Magnetic field due to a circular loop carrying current

A magnetic field is produced by moving electric charges and intrinsic magnetic moments of elementary particles associated with a fundamental quantum property known as spin.

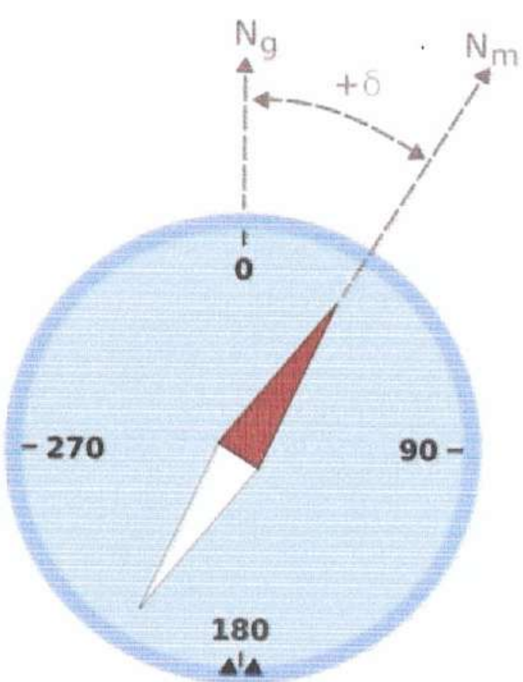
Symbol: B or H

Unit: Tesla

Base Unit: (Newton.Second)/Coulomb

MAGNETIC VARIATION

Magnetic variation, is the angle on the horizontal plane between magnetic north (the direction the north end of a magnetized compass needle points, corresponding to the direction of the Earth's magnetic field lines) and true north (the direction along a meridian towards the geographic North Pole). This angle varies depending on position on the Earth's surface and changes over time.



Example of magnetic declination showing a compass needle with a "positive" (or "easterly") variation from geographic north. N_g is geographic or true north, N_m is magnetic north, and δ is magnetic declination

Somewhat more formally, Bowditch defines variation as "the angle between the magnetic and geographic meridians at any place, expressed in degrees and minutes east or west to indicate the direction of magnetic north from true north. The angle between magnetic and grid meridians is called grid magnetic angle, grid variation, or grivation.

WORKING FORMULA:

The magnitude of the field B along with the axis of a coil is given by,

$$B = \frac{\mu_0 n I}{2} \frac{r^2}{(x^2 + r^2)^{3/2}}$$

$\mu_0 = 4\pi \times 10^{-7}$ = *Absolute permeability of free space*

n = *Number of turns of the coil*

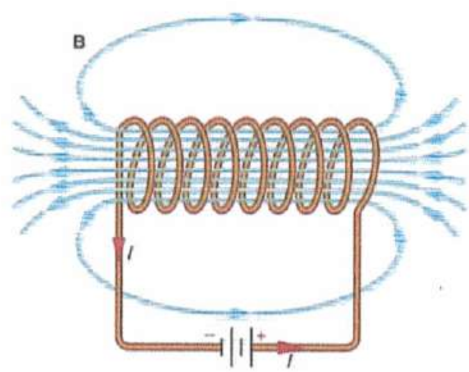
I = *Current flowing through the coil*

r = *Radius of the coil*

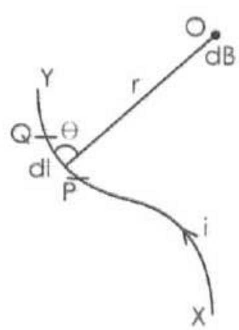
x = *Distance of the point from the center of the coil*

THEORY

A current carrying wire generates a magnetic field.



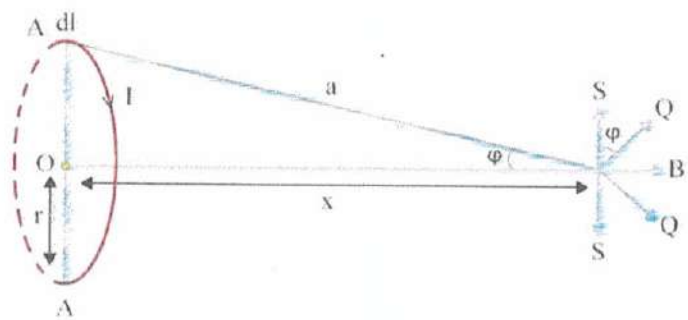
According to BIOT – SAVARTS law, the magnetic field dB



at a point due to an element of a conductor carrying current is directly proportional to the strength of the current , i directly proportional to the length of the element, dl directly proportional to the Sine of angle θ between the element and the line joining the element to the point and inversely proportional to the square of the distance r between the element and the point.

$$dB = \frac{\mu_0}{4\pi} \frac{i \, dl \, Sin\theta}{r^2}$$

By BIOT – SAVARTS law, the total magnetic field at a point



which is at a distance x away from the axis of a circular coil of radius r , having n turns is given by,

$$B = \frac{\mu_0 n I}{2} \frac{r^2}{(x^2 + r^2)^{3/2}}$$

$\mu_0 = 4\pi \times 10^{-7}$ = *Absolute permeability of free space*

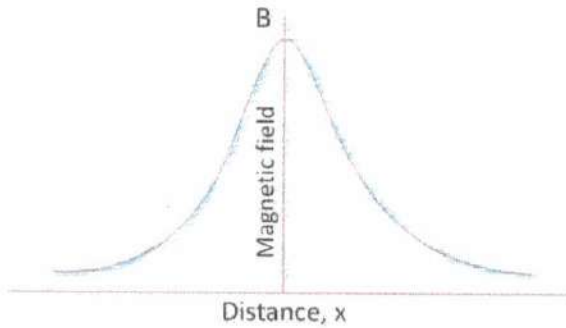
n = *Number of turns of the coil*

I = *Current flowing through the coil*

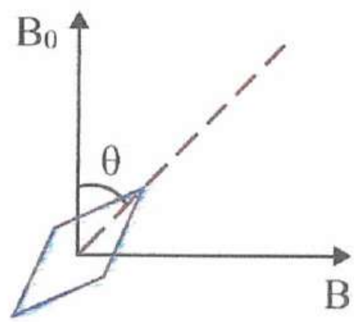
r = *Radius of the coil*

x = *Distance of the point from the center of the coil*

The magnetic field with the distance x along the axis of a circular coil carrying current varies as shown.



If we arranged the plane of the coil parallel to the horizontal



component of Earth's magnetic field B0, then, from the tangent law, we can write,

$$B = B_0 \tan\theta$$

$$\theta = \text{Deflection of the magnetic needle from } B_0 \text{ at the point } P$$

$$B_0 = 3.5 \times 10^{-5} \text{ Tesla}$$

MATERIAL REQUIRED

- Ammeter
- Rheostat
- Connecting wires
- Tangent Galvanometer
- Commutator
- One way key
- Compass
- Battery Eliminator
- Magnetic Field Sensor
- Rotary Motion Sensor

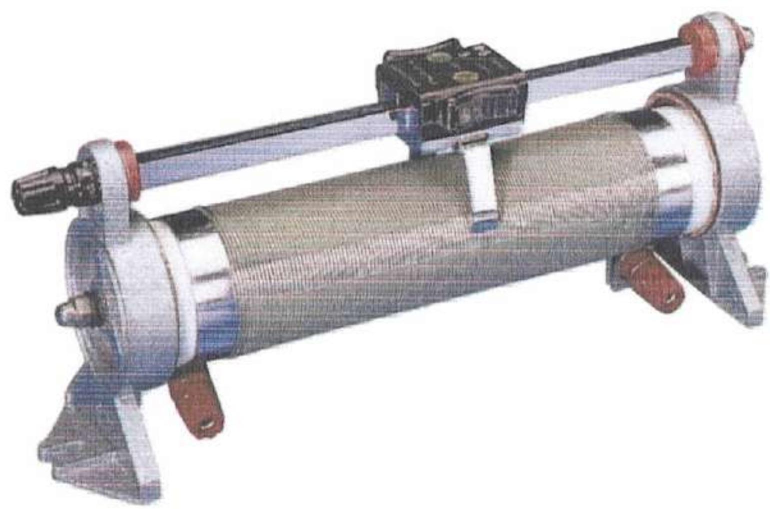
AMMETER:

An ammeter (abbreviation of Ampere meter) is a measuring instrument used to measure the current in a circuit. Electric currents are measured in Amperes (A), hence the name.

The ammeter is usually connected in series with the circuit in which the current is to be measured. An ammeter usually has low resistance so that it does not cause a significant voltage drop in the circuit being measured.

RHEOSTAT:

A rheostat is an electrical device used in many applications that require the adjustment of current or the varying resistance in an electric circuit. This device was named “Rheostat” using two Greek words “rheos” and “status” (meaning a current controlling device), by an English Scientist Sir Charles.



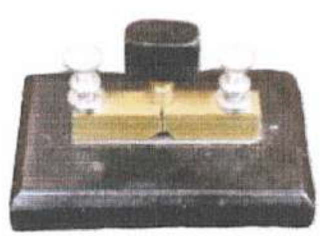
Rheostats are two-terminal devices, with one lead connected to the wiper and the other lead connected to one end of the resistance track.

CONNECTING WIRES:

Connecting wires allows an electrical current to travel from one point on a circuit to another because electricity needs a medium through which it can move. Most of the connecting wires are made up of copper or aluminum.

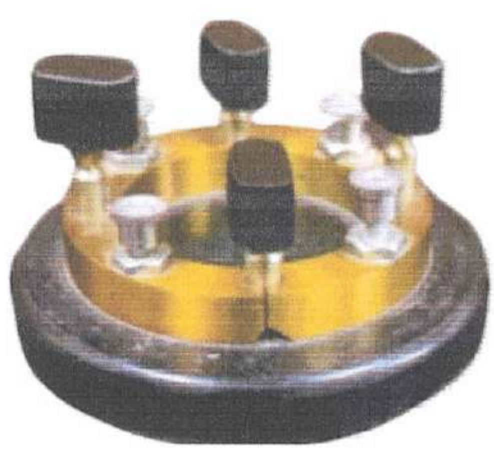
ONE WAY KEY:

A one-way switch basically operates as a make or break switch. When it is turned on, the two terminals are connected, and when it is turned off, the contact between the two is broken. In contrast, a two-way switch is basically two, one-way switches combined into one.



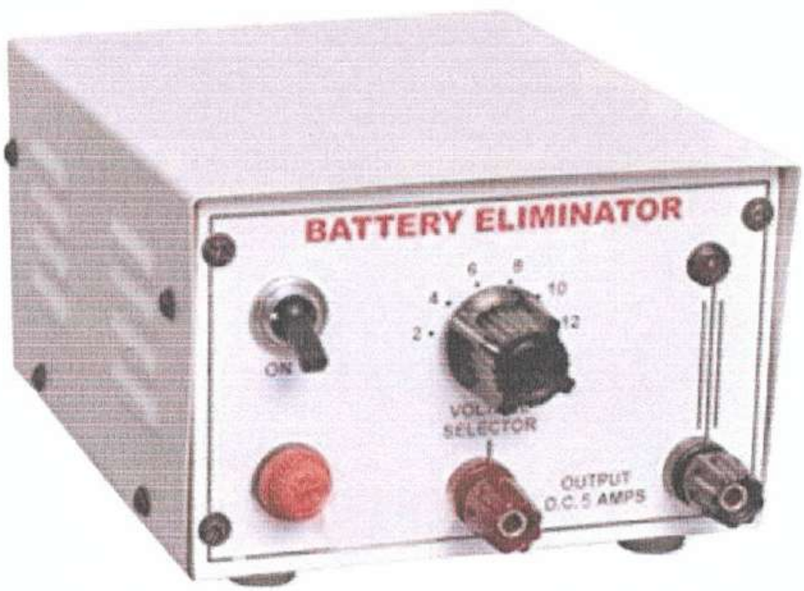
COMMUTATOR:

A commutator is a rotary electrical switch in certain types of electric motors and electrical generators that periodically reverses the current direction between the rotor and the external circuit. It consists of a cylinder composed of multiple metal contact segments on the rotating armature of the machine.



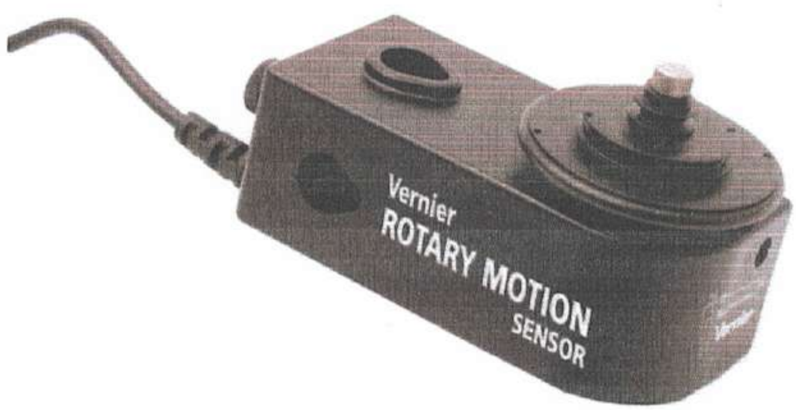
BATTERY ELIMINATOR:

A battery eliminator is a device powered by an electrical source other than a battery, which then converts the source to a suitable DC voltage that may be used by a second device designed to be powered by batteries.



ROTARY MOTION SENSOR:

The Vernier Rotary Motion Sensor is a bidirectional angle sensor designed to measure rotational or linear position, velocity and acceleration.



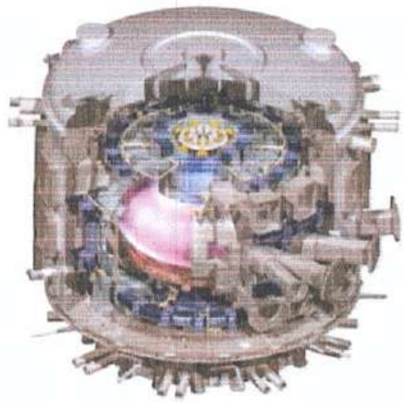
Typical experiments include measuring moments of inertia, torque, pendula, and Atwood's machine experiments. Even though we call it a Rotary Motion Sensor, it can also be used to measure linear position to a fraction of a millimeter.

TANGENT GALVANOMETER:

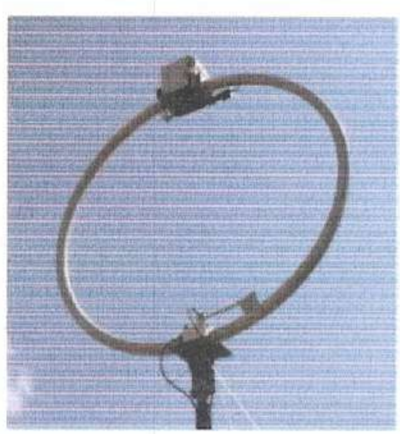
A galvanometer consisting of a very small magnetic needle in the center of a large vertical circular coil of wire through which electric current is passed and whose plane is in the magnetic meridian with the intensity of the current being proportional to the tangent of the angle of deflection of the needle.

APPLICATIONS:

In the construction of stellarators:



A stellarator is a toroidal magnetic confinement device that is characterized by having magnetic surfaces created entirely from external magnets. Traditionally used for fusion research, stellarator possess unique properties that make them attractive as charged particle traps. The principle of circular coil is applicable in the working of the loop antennas.



Govt. College for Women Parade Ground, Jammu
(Autonomous College)

Department of Physics

Title of the Project: Study the zener diode V- I characteristics and its voltage regulation characteristics

Academic Session: 2020-2021

Class/Semester: B.Sc. Semester - III

Project Submitted by :

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2	Sakshi Sharma	374
3	Sakshi Saini	386
4	Kashish Sharma	527
5	Prinka Devi	531
6	Mansimran Sasan	562

Teacher Incharge

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Principal
Govt. College for Women
Parade, Jammu

Govt. College for Women Parade Ground, Jammu
(Autonomous College)

Department of Physics

Title of the Project: Study the wavelength of sodium light by using plain diffraction grating or Newton's ring method

Academic Session: 2020-2021

Class/Semester: B.Sc. Semester – IV

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Project Work
Of
PHYSICS

Topic:- Diffraction

B.Sc. Sem IV

Department of Physics

Signature

Govt. College for Women Parade Ground, Jammu
(Autonomous College)

Department of Physics

Title of the Project: Study the wavelength of sodium light by using plain diffraction grating or Newton's ring method

Academic Session: 2020-2021

Class/Semester: B.Sc. Semester – IV

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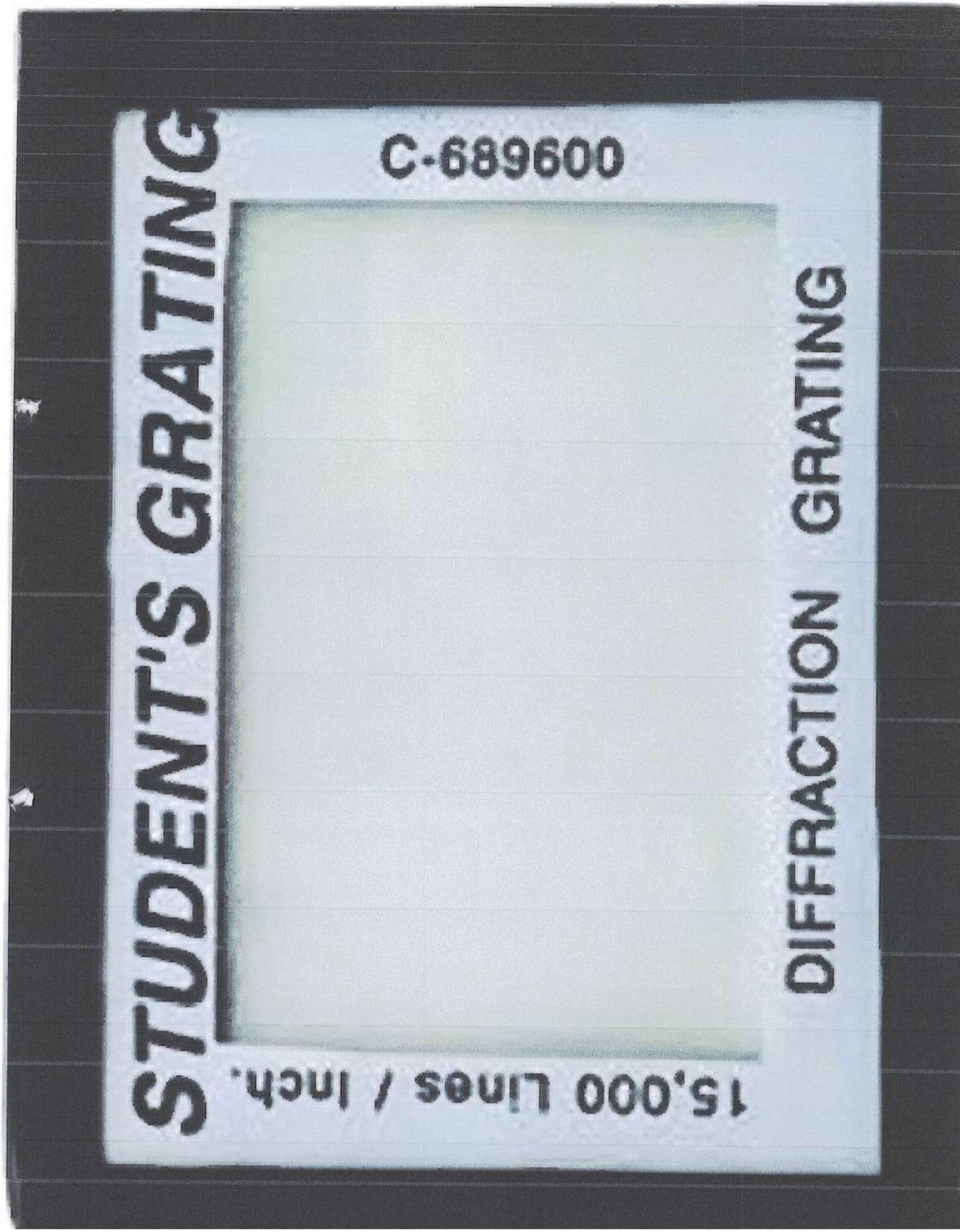
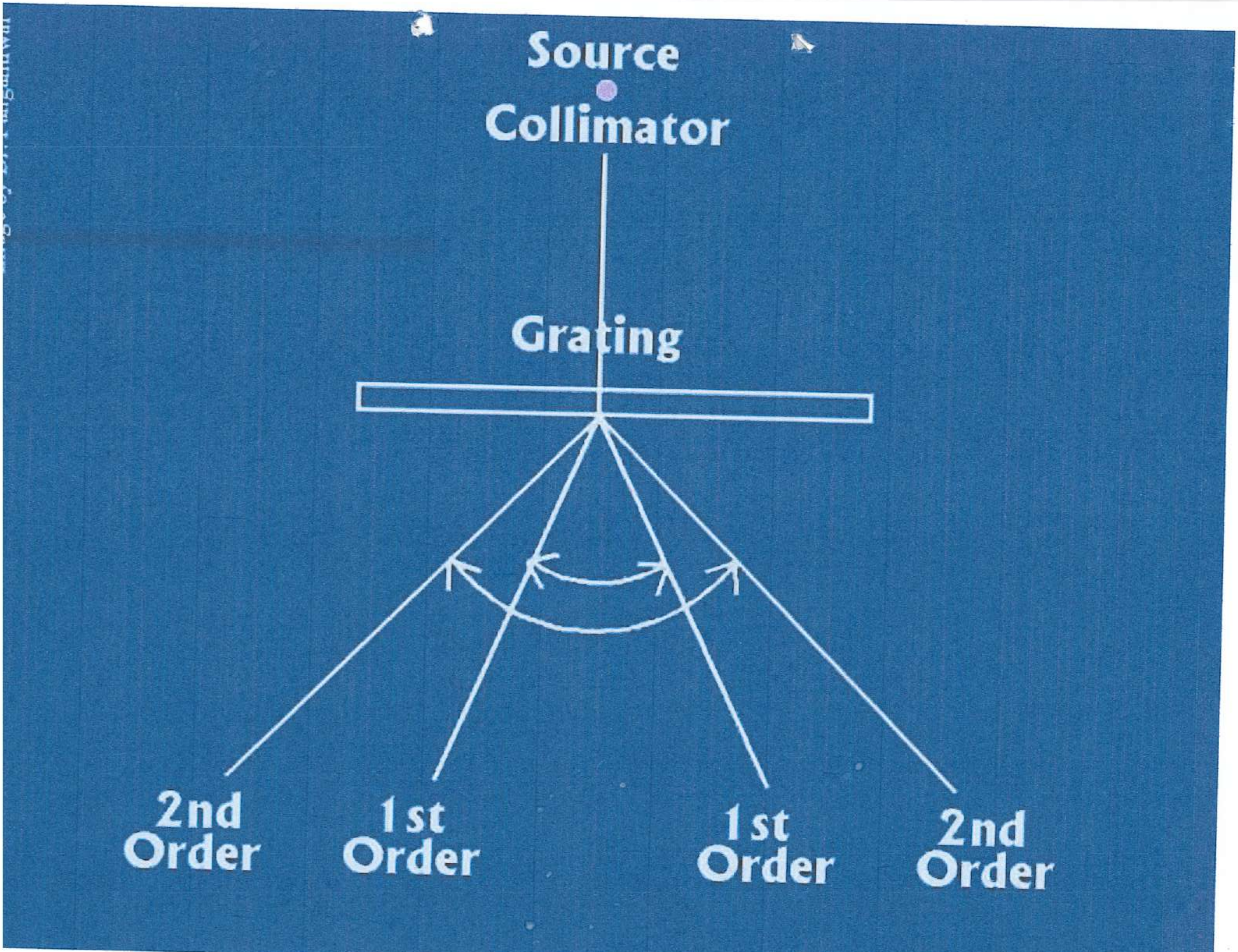
PROJECT
REPORT

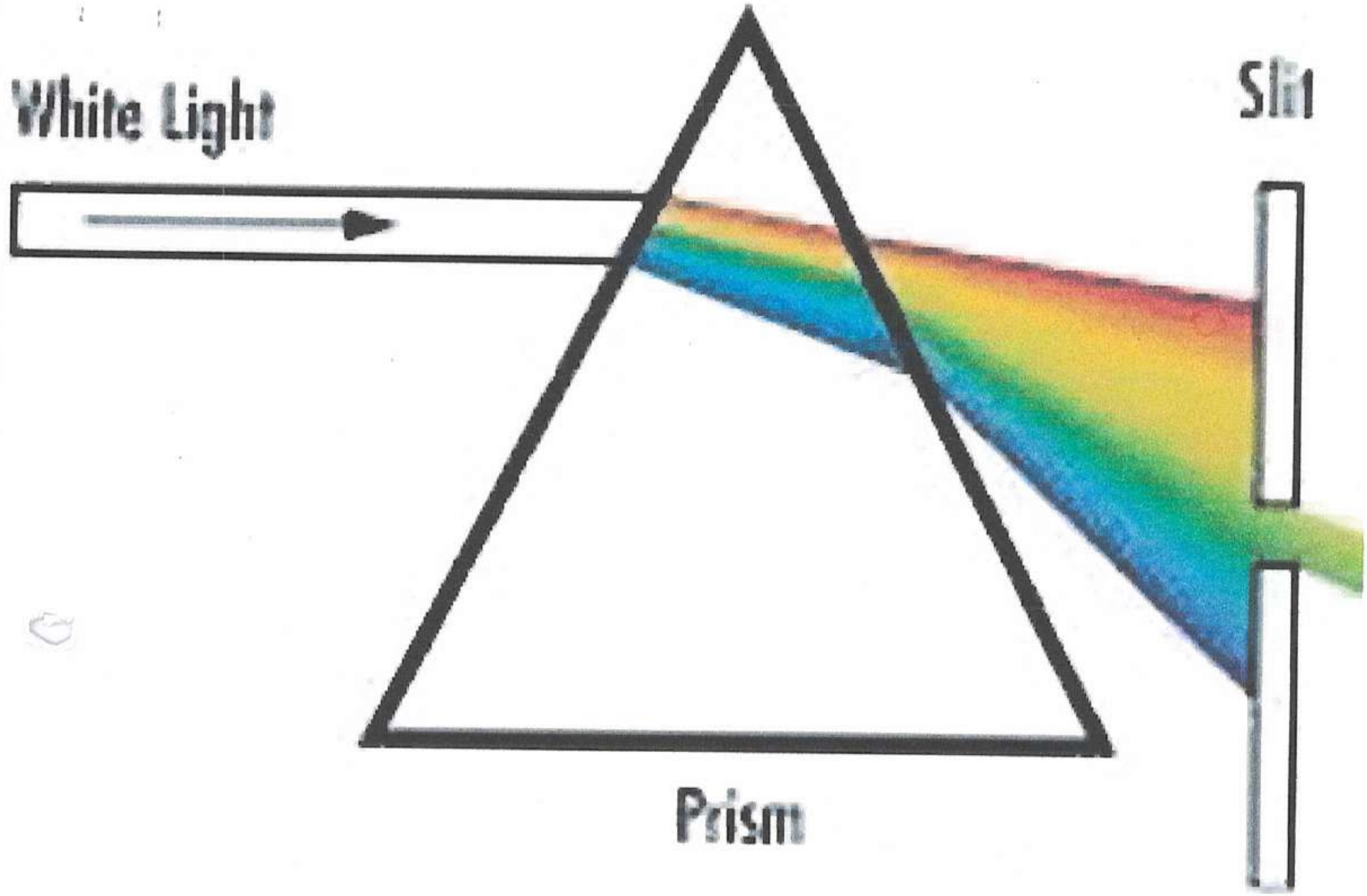
PHYSICS

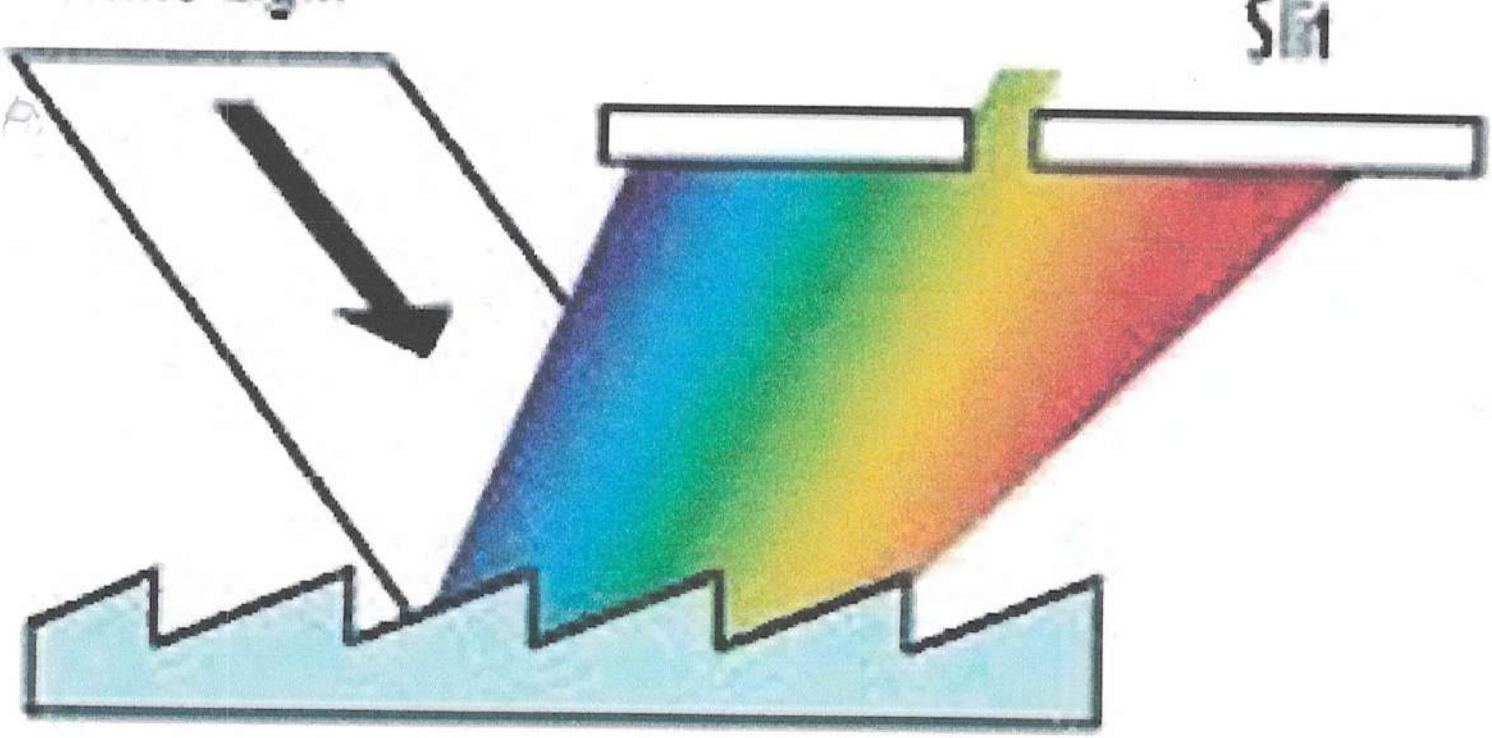
Government
College for Women,
Parade

Department of
Physics


STUDENT'S GRATING
C-689600
DIFFRACTION GRATING
15,000 Lines / Inch.


Source
Collimator
Grating
2nd Order
1st Order
1st Order
2nd Order





Diffraction Grating

INDEX

- Newton's Rings
- Formation
- Experimental Arrangement
- Determination of Diameter in Reflected System and transmitted System.
- Uses :-
  1) Determination of Wave Length of Monochromatic Light (Sodium Light) and White Light.
  2) Determination of Refractive Index of Liquid.

Govt. College for Women Parade Ground, Jammu
(Autonomous College)

Department of Physics

Title of the Project: Study of Half wave rectifier

Academic Session: 2020-2021

Class/Semester: B.Sc. Semester – V

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2	Jigmat Palmo	427
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Principal
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Parade, Jammu

Project Report Half Wave Rectifier

Index:

AIM:

To construct a half wave rectifier and show that that Alternating Current is rectified into a Direct Current

Introduction:

The process of converting the AC current into DC current is called rectification.

Half-wave rectifiers transform AC voltage to DC voltage. A half wave rectifier circuit uses only one diode for the transformation. A half wave rectifier is defined as a type of rectifier that allows only one-half cycle of an AC voltage waveform to pass while blocking the other half cycle. In this session, let us know in detail about the half-wave rectifier..

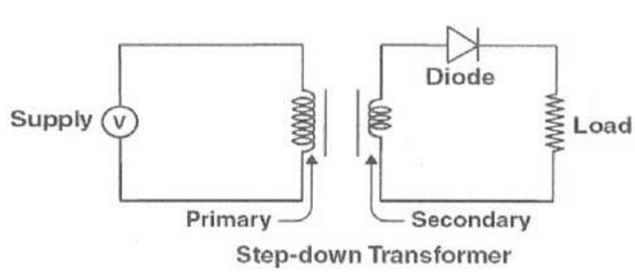
Half Wave Rectifier Circuit:

A half-wave rectifier is the simplest form of the rectifier and requires only one diode for the construction of a half wave rectifier circuit.

A half wave rectifier circuit consists of three main components as follows:

- A diode
- A transformer
- A resistive load

Given below is the half-wave rectifier diagram:



NAME :- VAISHALI DOGRA

SUBJECT :- CHEMISTRY

TEACHER'S NAME :- Gurpreet Kour

CLASS :- B.Sc. Sem.-VI th (Non-Medical)

REG. NO. :- 18GCPA1346

CLASS ROLL-No. :- 375

Topic :- What is a Catalyst Discuss Homogenous And Heterogenous Catalysis with Catalytic Steps And Examples

Principal

What is A Catalyst?

- A catalyst is a substance that alters the rate of chemical reaction without itself being consumed itself. In fact, a catalyst does not change the energetic characteristics of the reactants and products and the barriers between them. It instead provides the alternatives reaction pathway that bridges reactants and products. The process of alteration (acceleration or retardation) of the rate of a chemical reaction using a catalyst is called catalysis.
  If the activity of the catalyst decreases the rate of reaction, then it is called negative catalysis.

- Catalyst is a common word that you might come across while studing chemistry especially while learning about chemical reaction. while some of the chemical reaction occur quickly some take a long time and require extra materials or effect. This is where a catalyst comes in.

Some Important Characters of Catalyst:-

→ A catalyst does not initiate a chemical reaction.

→ A catalyst does not be consumed in the reaction.

→ Catalyst tend to react with reactants to form intermediates and at the some time facilitate the production of the final reaction product. After the whole process, a catalyst can regenerate.

→ A catalyst can be either solid, liquid or gaseous catalysts. Some of the solid catalysts include metals or their oxides, including sulfides, and halides. Semi-metallic elements such as boron, aluminium, and silicon are also used as catalyst. Likewise, liquid and gaseous elements which are in pure form are used as catalysts. Sometimes, these elements are also used along with suitable solvents or carriers.

→ The reaction which involves a catalyst in their system are known as
Catalytic Reaction.

Types of Catalysis :-

On the basis of nature and the physical state of the substance employed in the chemical reaction, catalysis is of three types:-

* Homogenous Catalysis
* Heterogenous Catalysis
* Auto catalysis

Homogeneous Catalysis :-

→ A catalyst which has some physical state as that of reactants is known as homogenous catalyst and phenomenon. is called as Homogenous catalysis.

For example, the hydrolysis of esters in presence of acid as catalyst is an example of homogenous catalysis because catalyst as well as the reactants are in liquid phase.

$$CH_3CO_2CH_3 + H_2O \xrightleftharpoons{H_3O^+} CH_3CO_2H + CH_3OH$$

In the absence of acids aqueous solutions of most esters do not hydrolyze at practical rates.

Most, often homogenous catalysis involves the introduction of an aqueous phase catalyst into an aqueous solution of reactants. In such cases, acids and bases are often very effective catalyst interacts with a reactant to form an intermediate substance. which, when decomposes or reacts with another reactants in one or more steps to regenerate the Original catalyst and form product. The portion is the most pervasive homogenous catalyst because water is the most common solvent.

Catalytic Steps of Homogenous Catalyst:-

It refers to the idealised sequence of steps between the adsorption of a reactant into the catalyst and the desorption of the product. There are five types of reaction that account for most of the homogenous catalytic cycles that have been proposed for hydrocarbon transformation.

(a) Ligand Co-ordination and Dissociation :-

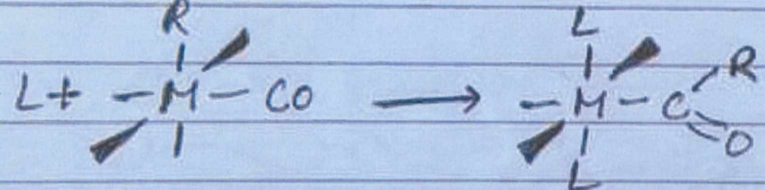
This involves the facile co-ordination of reactants to metal ions and facile loss of products from the co-ordination sphere. Both these process occur with low activation Gibb's Energy as labile metal complexes are involved.

These labile complexes as co-ordinatevely unsaturated in the sense that they contain an important co-ordination site or at most a site that is only weakly co-ordinated.

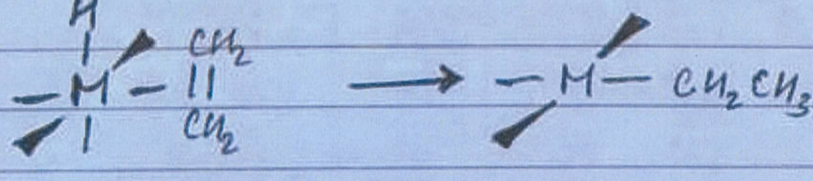
Square planar 16-electron complexes are co-ordinatively unsaturated and are often employed to catalyse the reactions of Organic molecules.

(b) Insertion And Elimination :-
The insertion involves the migration of alkyl and hydride ligands to the unsaturated ligand, as in the reaction.

Migration of Alkyl Ligand :-



Migration of Hydrogen Ligand :-



The conversion of alkyl alcohol to propanal using $[HCo(CO)_3]$ is an example of migratory insertion of hydrogen.

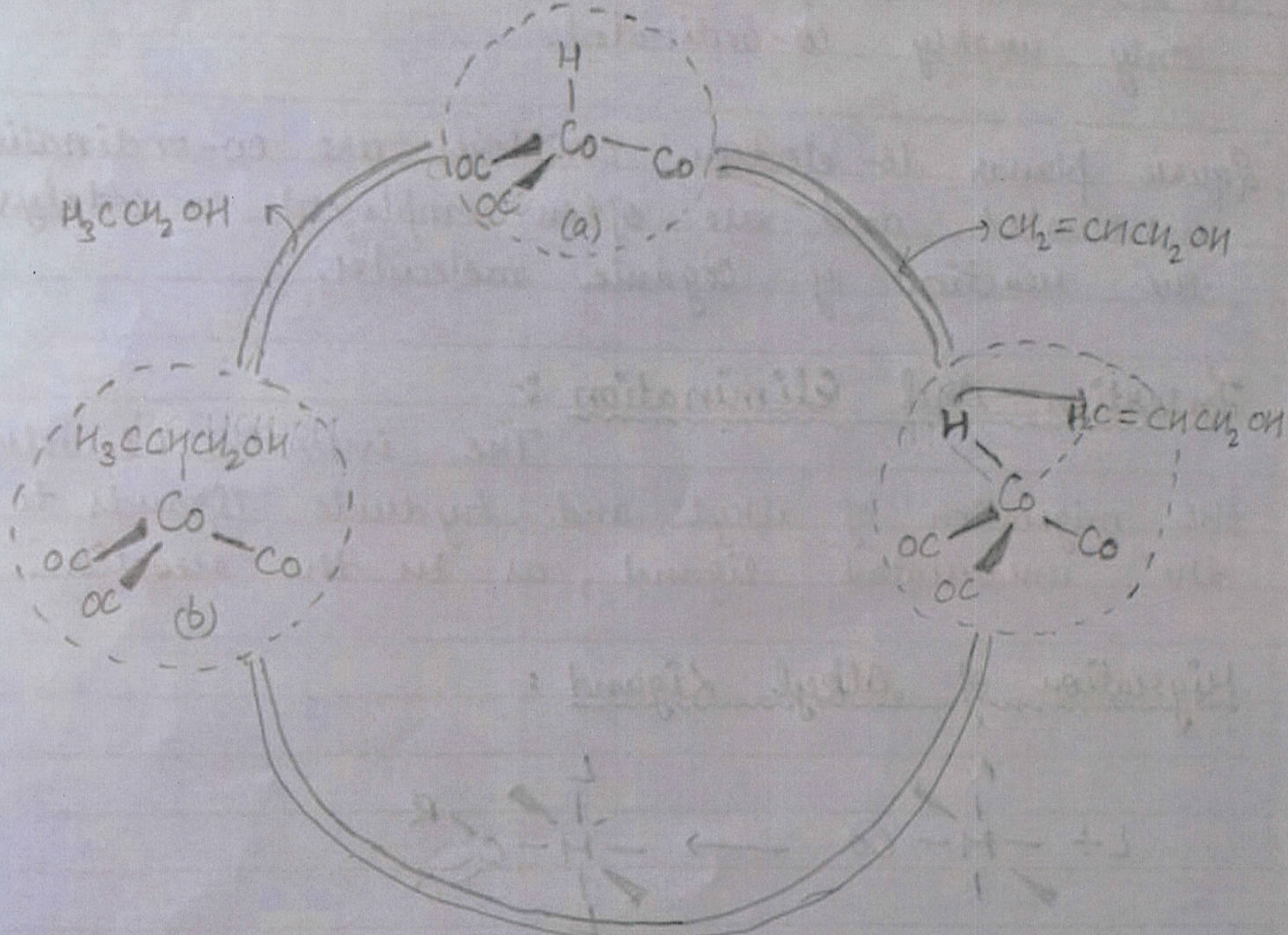
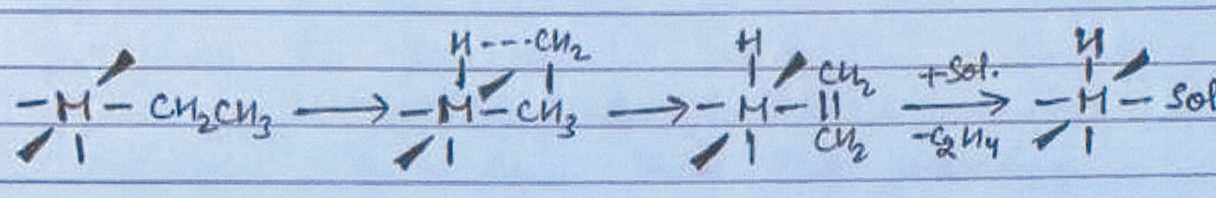


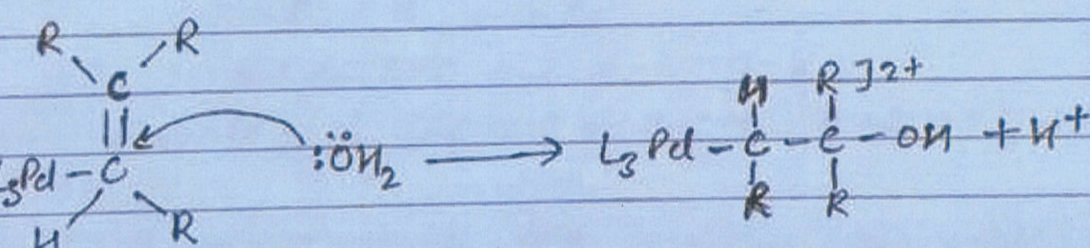
Fig: Catalytic cycle for the conversion of alKyl alcohol to proponal

Elimination is the reverse of insertion reaction, An example of elimination reaction is β-hydrogen elimination, resulting in the formation of alkene.



(c) Nucleophilic attack on co-ordinated ligands:-

The co-ordination of ligands such as CO and alkenes to metal ions in positive oxidation states results in the activation of the co-ordinated C-atoms towards attack by Nucleophiles such reactions are useful in catalysis as well as in Organometallic chemistry.



Similarly, a co-ordinated CO ligand is attacked by an OH-ion at the C-atom, forming a - CO(OH) ligand, which subsequently loses CO_2.

$$L_5M-CO + \overset{\ominus}{O}H \longrightarrow L_5M-\overset{O}{\overset{\|}{C}}-OH \longrightarrow [L_5M-H]^- + CO_2$$

(d) Oxidation And Reduction :-

Catalysts Containing metal ions are used in large-scale processes for the oxidation of hydrocarbons, as in the oxidation of p-xylene to terephthalic acid. The metal ion can play various roles in these radical Oxidation, as : Seen - from the following Mechanism :-

Initiation :- In. RH → In H + R

Here In - Radical Initiation

Propagation :- $R_2O \rightarrow R-O-R$

$R \cdot O_2 \rightarrow R-O-O$

$R-O-O. + R-H \rightarrow R-O-O-H + R$

Termination :-

$R^{\circ} + R^{\circ} \rightarrow R_2$

$R + R-O-O^{\circ} \rightarrow R-O-O-R$

$R-O-O^{\circ} + O^{\circ}-O-R \rightarrow R-O-O-O-O-R \rightarrow O_2$ + Non-Radicals

The metal ions control the reaction by contributing to the formation of the R-O-O radicals.

$Co(II) + R-O-O-H \rightarrow Co(ROOH) \rightarrow Co(III)OH + R-O$

$Co(II) + R-O-O-H \rightarrow Co(II) \rightarrow R-O-O + H^+$

The metal atom shuttles back and forth between oxidation states in this pair of reactions. A metal ion can also act as an initiator.

For Example :-

$$ArCH_3 + Co(III) \longrightarrow {}^{\bullet}Ar^{+}CH_3 + Co(II)$$

Examples of Homologeneous Catalysis :-

(1) Acid Catalysed Condensation :-

Acid Catalysed condensation of phenol and acetone to bisphenol which is an important Intermediate in manufacture of epoxy resin and polycarbonates.

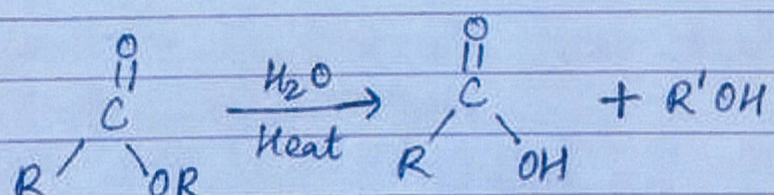
$$CH_3COCH_3 + 2\phi{-}OH + 2H^+ \longrightarrow OH{-}\phi{-}C(CH_3)_2{-}\phi{-}OH + H_2O$$

ϕ = benzyl grp.

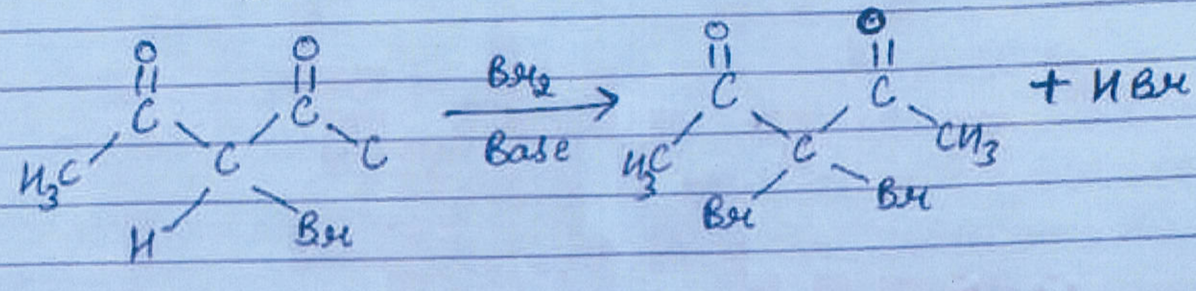
(2) Acid Catalyzed dehydration of ethyl alcohol to Ethylene

$$CH_3CH_2OH \xrightarrow{H^+} CH_2{=}CH_2 + H_2O$$

(3) Hydrolysis of Ester :- Hydrolysis of Caboxylic ester to form the parent carboxylic acid and an alcohol.



(4) Acid or base Catalysed Halogenations :- Ketones can be Halogenated in the presence of acid or base and (X_2).



Heterogeneous Catalysis :-

→ A catalyst whose physical state is not same as that of reactants is known as heterogenous Catalyst and phenomenon is known as heterogeneous catalysis.

For example in Haber process for the manufacture of ammonia from nitrogen and hydrogen gas is iron with molybdenum. Here Iron acts like catalyst and remains in solid state whereas both reactants; nitrogen and hydrogen are in gaseous state.

Molybdenum is promoter here that enhances the activity of catalyst.

$$N_2(g) + H_2(g) \xrightarrow{Mo(s)/Fe} 2NH_3(g)$$

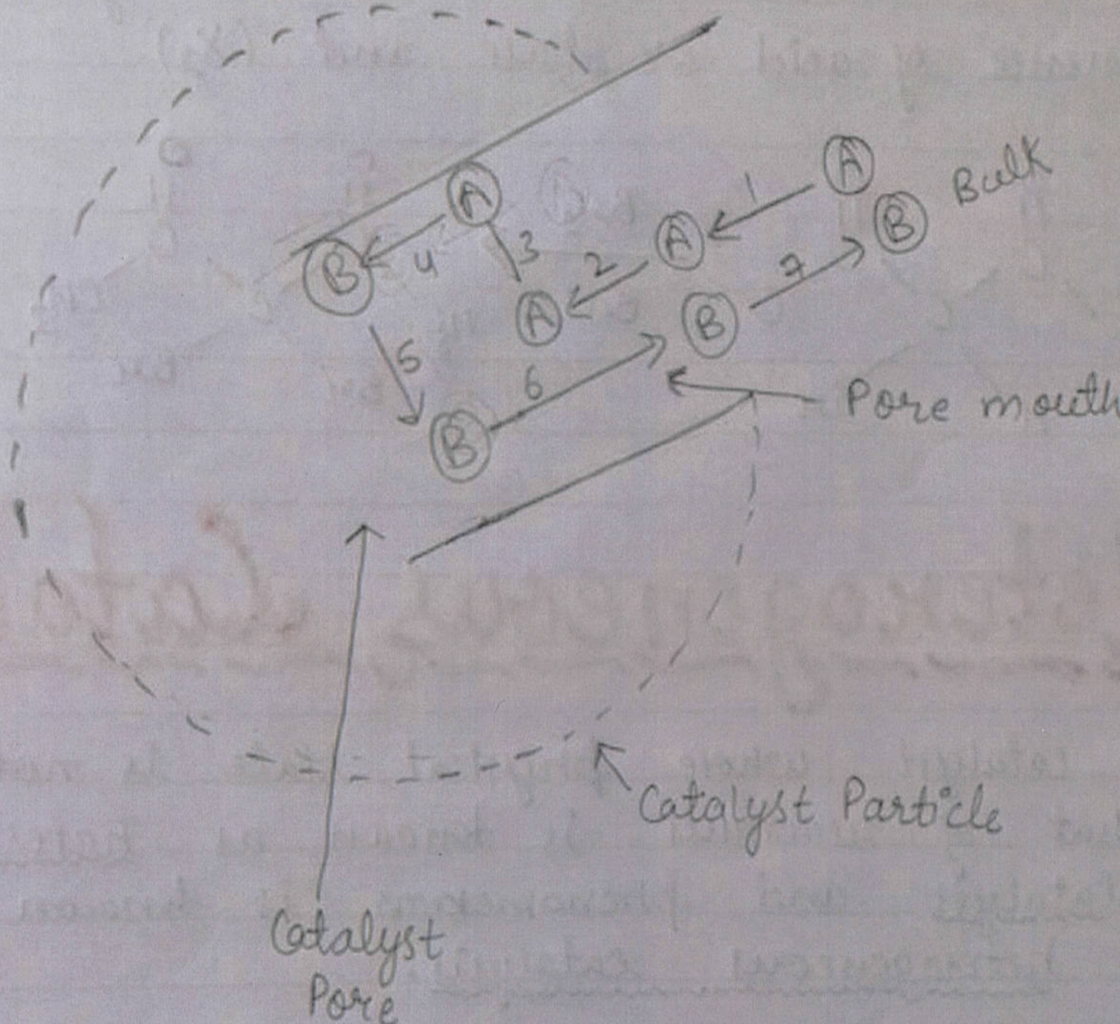


Fig. :- Catalytic steps in solid Catalytic Rxn.

Catalytic Steps :-

In general, it is believed that the entire surface of the solid catalyst is not responsible for catalysing any reaction. Only certain sites on the catalyst surface actually participate in the reaction and these sites are called active sites on the catalyst. These sites may be the unsaturated atoms resulting from surface irregularities or atom with chemical properties that enable the intraction with the adsorbed reactant atoms or molecules. Activity of the catalyst is directly proportional to the number of these active sites available on the surface and is often expressed in terms of turn over frequency. Turnover, frequency is defined as the no. of molecules reacting per active site per second at the condition of experiments.

A solid cataleytic reaction $A \rightarrow B$ goes through the following steps. The steps are illustrated in fig. given side of the page.

(1) Transport of reactant (A) from bulk fluid to pore mouth on the external surface of catalysts pellets

(2) Diffusion of the reactant (A) from the pore mouth through the catalyst pores to the immediate vicinity of internal catalytic surface.

(3.) Adsorption of reactant (A) Onto the catalyst surface.

(4.) Reaction of (A) on the catalyst surface producing product (B).

(5.) Desorption of the product (B) from the surface.

(6.) Diffusion of the product (B) from interior part of pores to the pore mouth on the external surface.

Example of Hetrogenous Catalyst :-

1. Heterogenous Catalyst like Ni (solid) in hydrogenation of olefins (Gas or liquid) that results the formation of saturated hydro hydrocarbons.

$$H_2C = CH_2 + H_2(g) \xrightarrow{N(S)} CH_3CH_3\,(g)$$

(2.) Similarly Palladium on activated charcoal is used in the hydrogenation of nitro groups to form amine groups is also an example of Heterogenous Catalysts.

$$RNO_2(l) + H_2(g) \xrightarrow{Pd-charcoal(S)} RNH_2(l) + H_2O$$

(3.) Oxidation of ammonia to nitric acid also involves the use of Pt as catalyst in which Pt is in solid State whereas both reactants remain in gaseous state.

$$2NH_3(g) + O_2(g) \xrightarrow{Pt(s)} 2NO(g) + 3H_2O(g)$$

(4.) Contact process for the manufacture of sulphuric acid requires solid catalyst that is vanadium oxide with gaseous reactants, sulphur dioxide gas and oxygen.

$$SO_2(g) + O_2(g) \xrightarrow{V_2O_5(s)} 2SO_3(g)$$

CHEMISTRY PRACTICAL

PROJECT WORK

GOVERMENT COLLEGE FOR WOMEN

PARADE GROUND, JAMMU

CHEMISTRY PRACTICAL PROJECT WORK ON "FERTILIZERS"

SUBMITTED BY	SUBMITTED TO
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Registration No : 18GCPA2802

B.Sc (Non-medical)

$\underline{VI}^{th}$ semester

Roll no = 439

Sub: Chemistry Practical Project work

CONTENT

- What are fertilizers. Discuss their classification and uses.
- How to determine the free acidity in Ammonium sulfate fertilizers.

WHAT IS FERTILISER

A fertilizer in any material of natural or synthetic origin that improve the levels of the available plant nutrients or the chemical and physical properties of the soil. thereby directly or indirectly enhancing the growth, yield and quality of the plant.

Fertilizers may be distinct from liming materials or other non-nutrient soil amendments. Many sources of fertilizer exist both natural and industrially produced. For most modern agriculture practices, fertilization focuses on three main macro nutrients: Nitrogen (N), Phosphorus (P) and Potassium (K) with occasional addition of supplements like rock dust for micronutrients. Farmers apply these fertilizers in a variety of ways: through dry or pelletized or liquid application processes, using large agricultural equipment or hand-tool methods.

Historically fertilization came from natural or organic sources: compost, animal manure, human manure, harvested minerals, crop rotations and byproducts of humaina nature industries (ie fish processing waste or bloodmeal from animal slaughter). However, starting in the 19th century after innovations in plant nutrition an agricultural industrial developed around synthetically created fertilizers. This transition was important in transforming the global food system, allowing for large scale industrial agriculture with large crop yields. In particular nitrogen-fixing chemical process such as the Haber process at the begining of the 20th-century amplified by production capacity created during World War II led to a boom in using nitrogen fertilizer. In the half of the 20th century, increased use of nitrogen fertilizers (800% increase between 1961 and 2019) have been a crucial components of the increased productivity of conventional food systems (more than 30% per capita) as part of the so called "Green Revolution".

Synthetic fertilizer used in agriculture has wide-reaching environmental consequences.

Alamb

Mechanism

Fertilizers enhance the growth of plants. This goal is met in two ways, the traditional one being additives that provide nutrients. The second mode by which some fertilizers act is to enhance the effectiveness of the soil by modifying its water retention and aeration.

- three main micronutrients are:

→ Nitrogen (N) : leaf growth

→ Phosphorus (P) : Development of roots, flowers, seeds, fruit.

→ Potassium (K) : Strong stem growth, movement of water in plants, promotion of flowering and fruiting.

- Three secondary macronutrients :

→ Calcium (Ca)

→ Magnesium (Mg)

→ Sulfur (S)

- micronutrients : Copper (Cu), Iron (Fe), Manganese (Mn), molybdenum (Mo), Zinc (Zn), boron (B). Of occasional significance are silicon (Si), cobalt (Co) and Vanadium (V).

The nutrients required for healthy plant life are classified according to the elements, but the elements are not used as fertilizers. Instead compounds. containing these elements are the basis of fertilizers. The marco nutrients are consumed in larger quantities and are present in plant tissue in quantities from 0.15% to 6.0% on a dry matter (DM) (0% moisture) basis. Plants are made up of four main elements, hydrogen, oxygen, carbon and nitrogen. Carbon, hydrogen and oxygen are widely available as water and carbon-dioxide.

Although nitrogen makes up most of the atmosphere, it is a form that is unavailable to plants. Nitrogen is the most important fertilizer since nitrogen is present in proteins, DNA and other components (e.g chlorophyll). To be nutritious to plants, nitrogen must be made available in a 'fixed' form. Only some bacteria and their host plants (notably legumes) can fix atmospheric nitrogen (N_2) by converting it into ammonia. Phosphate is required for the production of DNA and ATP, the main energy carrier in cell

CLASSIFICATION OF FERTILISER

fertilisers are classified on the basis of their origin, nutrient present, physical state of ferlisers number of compounds present in fertilizers Some of these classification are discussed below.

A) Classification Based upon Sources

1. Natural organic fertilizers: Such fertilizers are obtained from animals and plants.

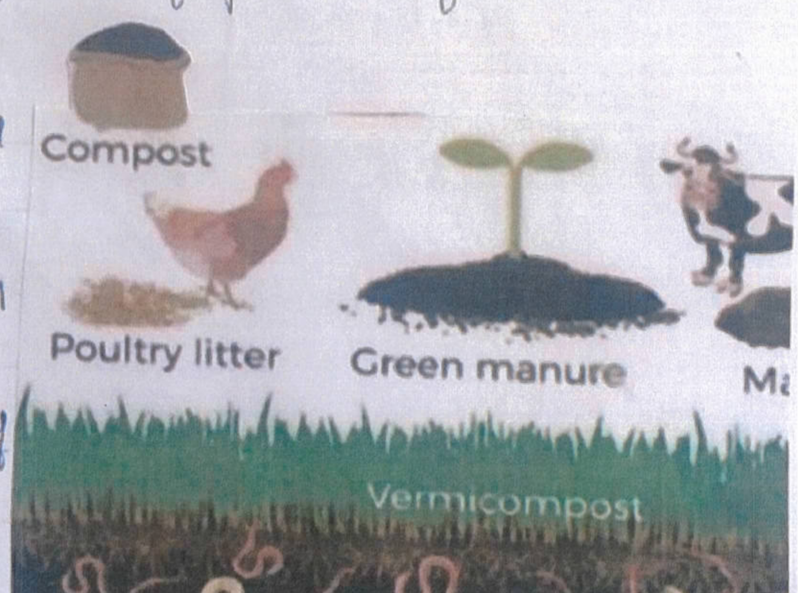
Some of these are:

ANIMAL MATTER: Powdered dry fish and red dry blood from the slaughter house are important nitrogeneous fertilisers.

FARM YARD MANURES: Typical farmyard manure consists of cow dung and human excretions.

GUANO: Gauno is a classic example of complete fertilizer and it is a mixture of birds excrement, fish refuge and fish bones

PLANT MATTER: Oil cakes from cotton seed meal, linseed meal and caster cake belong to this class and contain 7%, 6% and 6% of nitrogen respectively



2. Natural inorganic fertilizers:

<u>Rock Phosphates</u>: finely divided rock phosphate although insoluble in water, weather rapidly and may be used directly.

<u>Chile Saltpetre</u>: Chilean deposits would not last for more than 250 years, even at present about 83% of the world's requirements of $NaNO_3$ come from articial sources.

<u>Potassium Sulphate</u>: Natural potasium sources are wood ash (containing 5-6% potash) and waste materi[al] of sugar beet crops. These natural organic and inorganic fertilisers are not sufficient to make the soil productive, as they can not wholly meet the demand. Hence fertilisers are made artificially.

3. Artificial fertilisers:

One of the major problems for moder fertilizer industry is to det[illegible] the most effective and economical material

fig (Artificial fertilisers)

for supplying the nutrientrient. These may be developed under three groups, according to the nature of the element.

Nitrogen fertilizer

Nitrogenous fertilizes: This class of fertiliser include, urea, ammonium nitrate, calcium ammonium nitrate etc.

Potassium fertilizer

Potassium fertilisers: Potassium chloride and potassium sulphate are examples of these types of fertilisers.

Phosphorus fertilizer : Potassium chloride and potassium sulphate are examples of these type of fertilisers.

B. Based on their chemical composition: Based upon this criterion, fertilizers are of three types

Organic products

- Produced out of wastes of animal husbandary, plant decomposition products,

Mineral fertilizes

- Contains inorganic or synthetically produced organic

Synthetic soil conditioners

- Its main function is to improve the

C Based upon their Nutrient Content: Based upon this criteria fertilizers are of following four types:

Straight fertilizers

- These fertilizers which supply only one of the three primary nutrient i.e Nitrogen or Phosphorus or potassium are known as straight fertilizers.
- For example urea [$NHCONH_2$] provides only Nitrogen, Calcium phosphate, $Ca(H_2PO_4)_2$ provides only phosphorus and potassium chloride provides only potassium.

Compound fertilizers

- These fertilizers which contain two or three primary nutrients i.e Nitrogen(N), Phosphorus and Potassium are known as Compound fertilizer
- For example Ammonium phosphate $(NH_4)_2HPO_4$ contains two primary nutrients i.e N and P.

Mixed fertilizers

- Those fertilizers which are obtained by mixing two or more straight in a particular ratio are known as mixed fertilizers.
- The mixing is done in industries or it can be done manually by farmers e.g a mixture of potassium chloride (KCl) and ammonium phosphate [$(NH_4)_2HPO_4$] provide

USES OF FERTILIZERS

Fertilizers are used for various purposes. The uses of fertilizer are metioned below

⇨ They are used to providing additional nutrients to the plants.

- They are added to improve the yield of the crops.
- Nitrogen-rich fertilizer are used for the greening of Lawns.
- Organic fertilizers improve the texture and fertility of the soil.
- Gardeners use fertilizers to address certain need of the plants such as nutritional needs.
- Fertilizers are added to potted plants to replace to lost nutrients.

To determine free acidity in a given sample of ammonium sulphate ferlilizer.

Apparatus Required: 400ml beaker, funnel, burette, pipette, measuring cylinder, dropper, burette stand, filter paper, glass rod etc.

Chemical Required: Sodium hydroxide (0.1N), Ammonium sulphate

Chemical Reaction: $2NaOH + H_2SO_4 \rightarrow Na_2SO_4 + 2H_2O$

Procedure:

① Dissolve exactly 5gms of the given sample of ammonium sulphate (ferlilizer) is 50ml of cold water in a 400ml beaker

② Rinse and fill the burette with 0.1 N_2, NaOH solution obtained by disolving 0.4g of it in 100~~0~~ ml of water

③ Add 2-3 drops of methyl red- methylene blue mixed indicator to the solution obtained in step 1.

④ Titrate the solution obtained in step 4 using NaOH solution.

⑤ Note the initial reading of burette and add NaOH solution from the burette till change in colour from purple / grey to green is observed.

⑥ Note the final reading of burette.

⑦ Repeat the experiment thrice to get concordand reading (for volume of NaOH used).

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Observation table

S.N.	ml of sample (fertilizer) taken	Initial Reading in burette (IR)	Final Reading (FR)	Volume of NaOH used = FR-IR

Concordant reading = — ml

<u>Indicator</u>: Methyl red methylene blue mixed indicator solution obtained by mixing equal volume of 0.2% solution of methyl red and 0.1% solution of methylene blue.

End point: change in colour from purple/Grey to green

In burette: NaOH solution

Conical Flask: Fertilizer solution.

<u>Calculation</u>

0.1N NaOH → 0.4g of NaOH is present in 100ml of solution

1ml of NaOH solution contains NaOH = $\frac{0.4}{100}$ = 0.004g/ml

or 1ml of NaOH (0.1N) = 0.004g/mL

Further, 40gm of NaOH neutralises free acid (H_2SO_4) = 49gms

1gm of NaOH neutralises free acid (H_2SO_4) = $\frac{49}{40}$ gm

0.004 gm of NaOH neutralises free acid (H_2SO_4) = $\frac{49}{40} \times 0.004$ gms

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If volume of NaOH solution has been used then,
amount of free acid neutralised

$$= \frac{49}{40} \times 0.004 \times V \text{gms} = x \text{ gm}$$

% of free acid is given sample of fertilizer

$$= \frac{x}{\text{wt. of sample taken}} \times 100$$

Alternatively use the following formula directly

$$\text{free sulphuric acid (\% by mass)} = \frac{49 \times 0.4}{40 \times 100} \times \frac{V}{W} \times 100$$

where V = Volume of NaOH used
W = Weight of sample taken

RESULT : free sulphuric acid (% mass) present in a given sample of fertilizer =

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Academic Programme Pursuing - BSc.

Title of the project - Battery (characteristics, lead-Acid battery)

Registration no - 18GCPA1249

Semester - 6th

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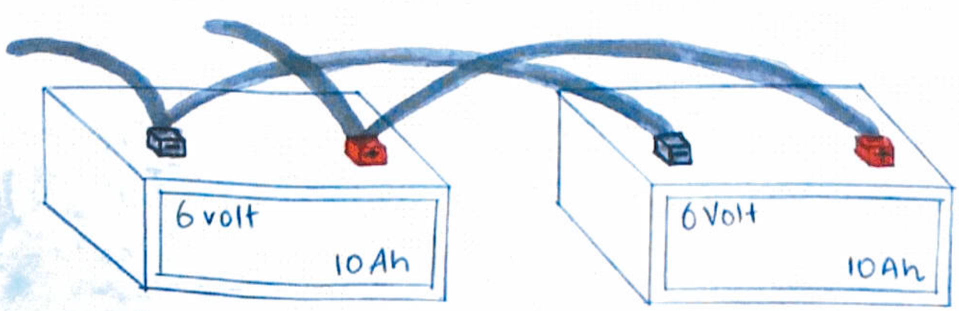
Batteries

Introduction

An electrochemical is a device capable of either generating electrical energy from chemical reactions or using electrical energy to cause chemical reactions. The electrochemical cells which generate an electric current are called voltaic cell or galvanic cells and the other ones are called electrolytic cells which are used to drive chemical reactions like electrolysis. A battery consists of one or more cells, connected either in parallel, series or series-and-parallel pattern.

Batteries Joined in Parallel



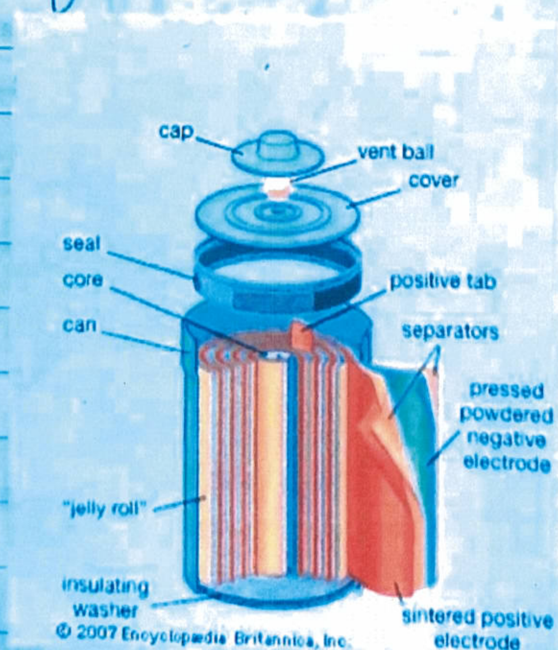
Same Voltage, double capacity (Ah)

Classification of Batteries

1. Primary cell or battery

A cell or battery that cannot easily be recharged after one use, and are discarded following discharge is known as Primary cell. Most primary cells utilise electrolytes that are contained within absorbent material or a separator (i.e., no free or liquid electrolyte), and are thus termed dry cell.

Examples- Dry cell, mercury cell, galvanic cell, fuel cell etc.



Dry Cell

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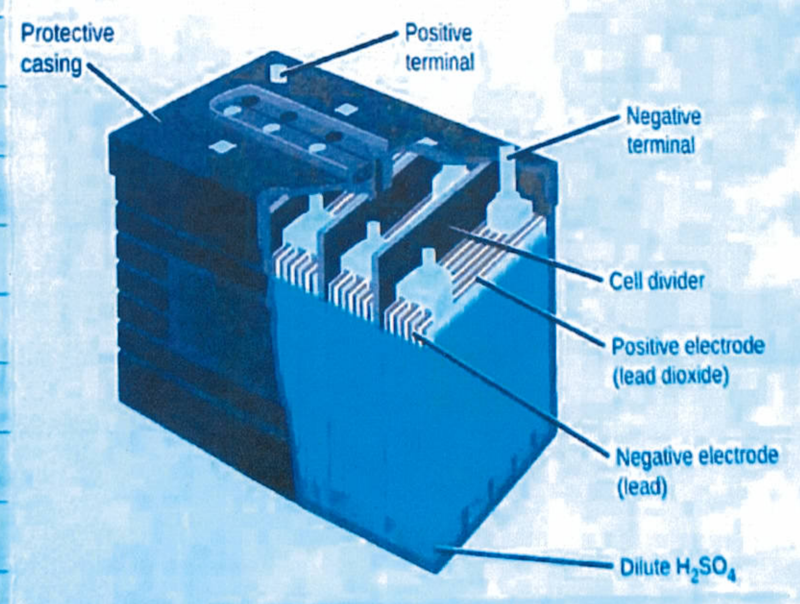
2. Secondary cell or Battery.

A cell or battery that can be electrically recharged after use to their original pre-discharge condition, by passing current through the circuit in the opposite direction to the current during discharge is known as secondary cell or battery.

Examples - Lead acid battery, lithium iron battery, Ni-Cd battery etc.



Lead-Acid Battery

Ni

Comparison of primary & secondary batteries

Primary cell or battery	secondary cell or battery
1. They have lower initial cost.	They have higher initial cost.
2. They have higher life-cycle cost.	They have lower life-cycle cost if charging is convenient and inexpensive.
3. They are disposable in nature	They are reusables.
4. They donot require charging and maintainance.	They require charging and maintainance.
5. Typically lighter and smaller thus traditionally more suited for portable applications.	Traditionally less suited for portable applications, although recent advances in lithium battery thechnology have led to the development of smaller/lighter secondary batteries.

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6.	They give longer service per charge and have good charge retention	Relative to primary battery systems, traditional secondary batteries exhibit inferior charge retention.
7.	They are not ideally suited for heavy load / high discharge rate performance.	They have superior high discharge rate performance at heavy loads.
8.	They are not idelly suitable for load - levelling, emergency backup, hybrid battery, and high cost military applications.	They are ideally suited for load-leveling, emergency backup, hybrid battery and high cost military applications.

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Characteristics of battery

1. A battery is composed of one or more cells, either parallel or series connected to obtain a required current / voltage capability (batteries comprised of series connected cells are by far the most common).

2. A battery can be used only once (Primary battery) or it can be used again and again after recharging (secondary battery).

3. mAh and Ah: The term mAh is an abreviation for "milliamper hour," and its a way to express the electrical capacity of smaller batteries. With larger batteries, like car batteries, we usually use ampere hours, or Ah. There are 1000 mAh in a single Ah. mAh is calculated by multiplying the amount of time the battery lasts by the amperes of the discharge current.

mAh = Time × I Amperes of discharge current

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4. ESR (Equivalent Series Resistance) is the internal resistance present in any cell that limits the amount of peak current it can deliver.

5. The Amp-hour capacity of a battery (or cell) is its most important figure of merit, it is defined as the amount of current that a battery can deliver for 1 hour before the battery voltage reaches the end-of-life point.

6. The "c" rate is a current that is numerically equal to the A-hr rating of the cell. Charge and discharge currents are typically expressed in fractions or multiples of the c rate.

Slow charging "Slow" charge is defined as a charging current that can be safely appelied to a battery indefinitely without any kind of monitoring or charge termination method (it is sometimes referred to as trickle charging.). A typical Ni-Cd battery will easily tolerate c/10, and some fast-charge Ni-Cd cells will accept up to c/3.

Fast charging "Fast" charge (usually defined as a 1 hour recharge) requires more complex charging circuitry (again raising the system cost) but gives the customer faster charging time (a very attractive selling point). The typical Ni-Cd or Ni-MH fast charger simply pumps current into the battery, and waits for the battery to signal when it had enough. Because of the possibility of battery damage and user safety hazards fast-charge systems must be designed to accurately monitor battery parameters like cell temperature and voltage.

7 Recharge Time: The amount of time that the typical consumer finds acceptable for battery recharging is highly variable, and depends on the item being powered.

8. The MPV (mid-point voltage) is the normal voltage of the cell, and is the voltage that is measured when the battery has discharged 50% of its total energy.

9. The measured cell voltage at the end of its operating life is called EODV, which stands

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for End of Discharge Voltage.

10. The gravimetric energy density of a battery is a measure of how much energy a battery contains. in comparison to its weight.

11. The volumetric energy density of a battery is a measure of how much energy a battery contains in comparison to its volume.

12. Peak Current : The maximum current that a battery can deliver is directly dependent on the internal equivalent series resistance (ESR) of the battery. The current flowing out of the battery must pass through the ESR, which will reduce the battery terminal voltage by an amount equal to the ESR multiplied times the load current ($V = I \times R$). More important, the current flowing through the ESR will cause power dissipation within the battery that is equal to the ESR multiplied times the current square ($P = I^2 \times R$). This can result in significant heating within the battery at high rates of discharge.

Lead Acid Battery

The battery which uses sponge lead and lead peroxide for the conversion of the chemical energy into electrical power. is called a lead acid battery. The lead acid battery is most commonly used in antimobiles, inverter, power stations etc. because it has higher cell voltage and lower cost. It is oldest rechargable battery and was invented by Gaston Plante in 1859.

Construction

The various parts of the lead acid battery are shown below. The container and thee plates are the main part of the lead aced battery. The container stores chemical energy which is converted into electrical energy by the help of the plates.

1. Container. The container of the lead acid battery is made of glass, lead lined wood, ceramic materials or moulded plastics. At the bottom of the container, there are ribs on half of which rest the positive plate and the others support

the negative plates. The material of which the battery containers are made should be resistant to sulphuric acid, should not deform or porous, or contain impurities which damage the electrolyte.

2. Plate. The plate of the lead - acid cell is of diverse design and they all consist some form of a grid which is made up of lead and the active material. The grid is essential for conducting the electric current and for distributing the current equally on the active material. If the current is not uniformly distributed, then the active material will loosen and fall out.

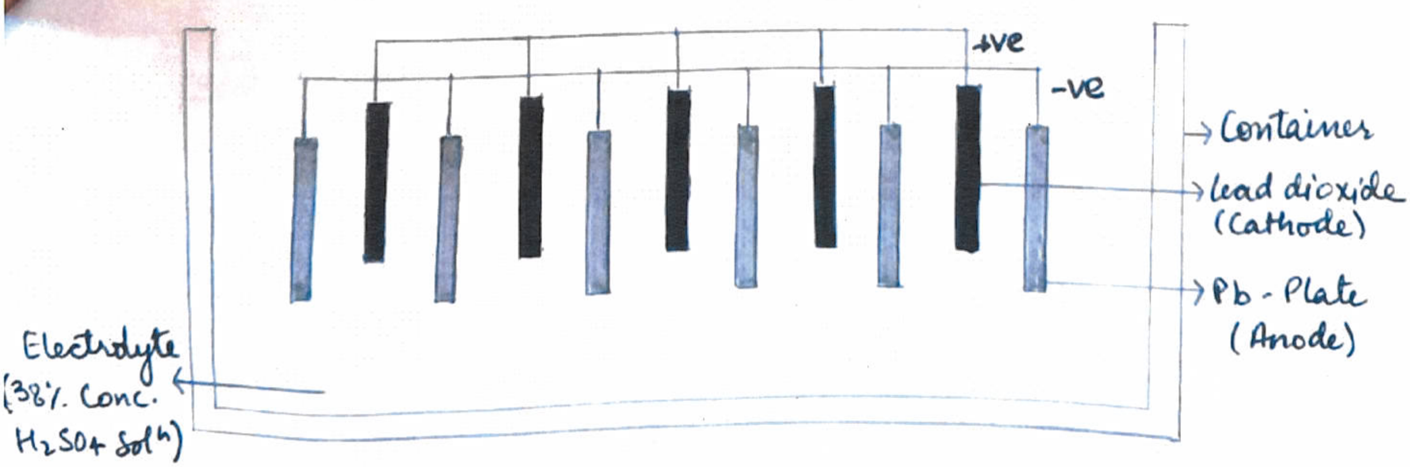

fig: Arrangement of plates in a lead acid - Battery

The grids are made up of an alloy of lead and antimony. These are usually made with the transverse rib that crosses the places at right angles or diagonally. The grid for the positive and negative plates are of the same design, but the grids for the negative plates are made lighter because they are not as essential for the uniform conduction of the current. Upon these plates are pasted active materials.

3. Active Material. The material in a cell which takes active, participation in a chemical reaction (absorption or evolution of electrical energy) during charging or discharging is called the active material of the cell.
The active elements of the lead acid are

a) Lead dioxide (PbO_2). It forms the positive active material. The PbO_2 are dark chocolate brown in colour. It forms +ve terminal of battery (cathode)

b) Sponge lead. It forms the negative terminal of battery (anode). It is grey in colour

c) Dilute Sulphuric Acid (H_2SO_4). It is used as an electrolyte. It contains 38% of sulphuric acid. Dil. H_2SO_4 used has a ratio of water : acid = 3:1.

4. Separators. The separators are thin sheets of non-conducting material made up of chemically treated leadwood, porous rubbers, or mats of glass fibre and are placed between the positive and negative to insulate them from each other. Seperators are grooved vertically on one side and are smooth on the other side.

5 Battery Terminals. A battery has two terminals the positive and the negative. The positive terminal with a diameter of 17.5 mm at the top is slightly larger than the negative terminal which is 16 mm in diameter.

Working of Lead Acid Battery

The lead acid storage battery is formed by dipping lead oxide plate and sponge lead plate in dil. sulphuric acid. A load is connected externally between these plates. In dil. H_2SO_4, the molecules of acid split into positively charged H^+ ions and negatively charged SO_4^{2-} ions. The H^+ ions on reaching PbO_2 plate receive electrons from it and become H-atoms, which attack PbO_2, thereby forming PbO and H_2O. This PbO reacts with H_2SO_4 and forms $PbSO_4$ and H_2O.

Reaction Involved During Discharging

At cathode
$$PbO_2 + 2H \longrightarrow PbO + H_2O$$
$$PbO + H_2SO_4 \longrightarrow PbSO_4 + H_2O$$
$$PbO_2 + H_2SO_4 + 2H \longrightarrow PbSO_4 + 2H_2O$$

SO_4^{2-} ions mooving freely in the solution, some of them reach at pure Pb plate, thereby forming $PbSO_4$, and lose two electrons per ion there. Since there would been inequality of electrons between these two plates, hence there would be a flow of current through the external load between these ~~too~~ two plates.

At anode $Pb(S) + SO_4^{2-}(aq) \longrightarrow PbSO_4(s) + 2e^-$

This process is called discharging of lead-acid battery and it leads to the accumulation of $PbSO_4$, and there is fall in the specific gravity of sulphuric acid solution. As a result, the rate of reaction falls due to the decrease in the potential difference between the plates.

The battery needs recharging when the density of H_2SO_4 falls below 1.20 g cm^{-3}. During recharging, the cell is operated ~~ligh~~ like an electrolytic cell. As the density of H_2SO_4 falls but there is still H_2SO_4 existing in the solution. On the application of electric current, H^+ ions move to the electrode (cathode) connected to negative terminal of the DC source. Here each H^+ ion takes one electrode ~~(cathode) connected to negative terminal~~ from that and becomes hydrogen atom. These H- atoms then attack $PbSO_4$ leading to the formation of Pb and H_2SO_4.

$$PbSO_4 + 2H \longrightarrow H_2SO_4 + Pb$$

On the hand, SO_4^{2-} ions move towards the electrode (anode) connected with the positive terminal of DC source where they will give up their extra electrons and become radical SO_4. The radical SO_4 cannot exist alone and form PbO_2 and H_2SO_4.

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$$PbSO_4 + 2H_2 + SO_4 \longrightarrow PbO_2 + 2H_2SO_4$$

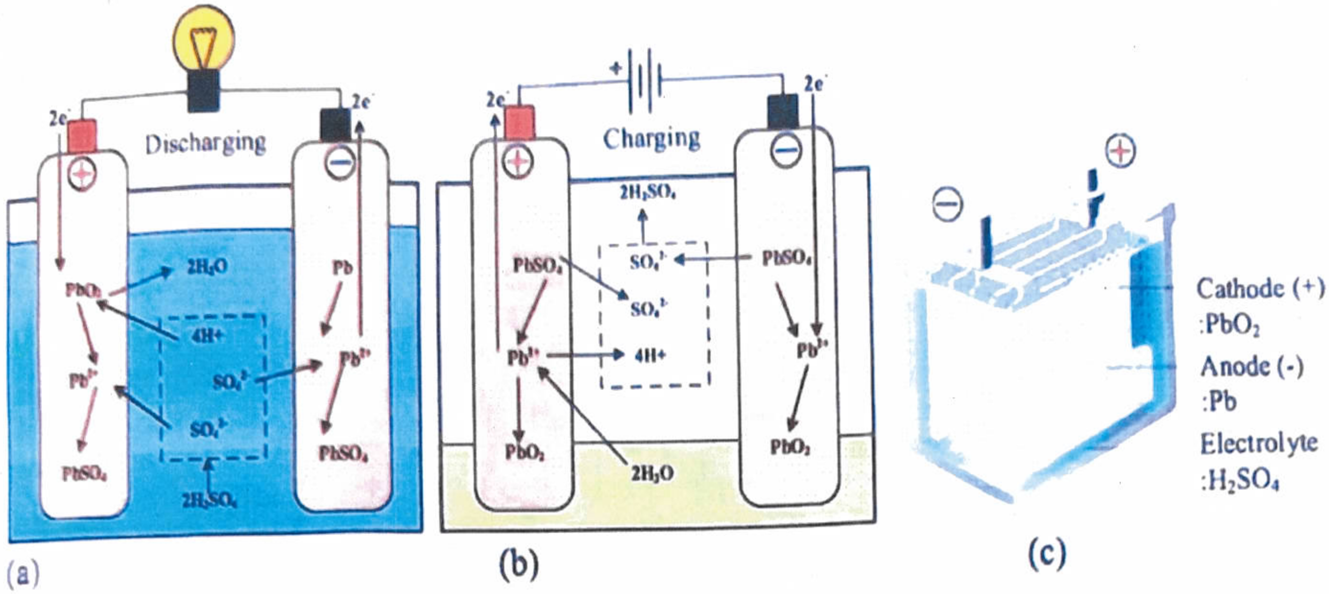
Hence during charging, the specific gravity of H_2SO_4 and potential of cell increases.

Advantages

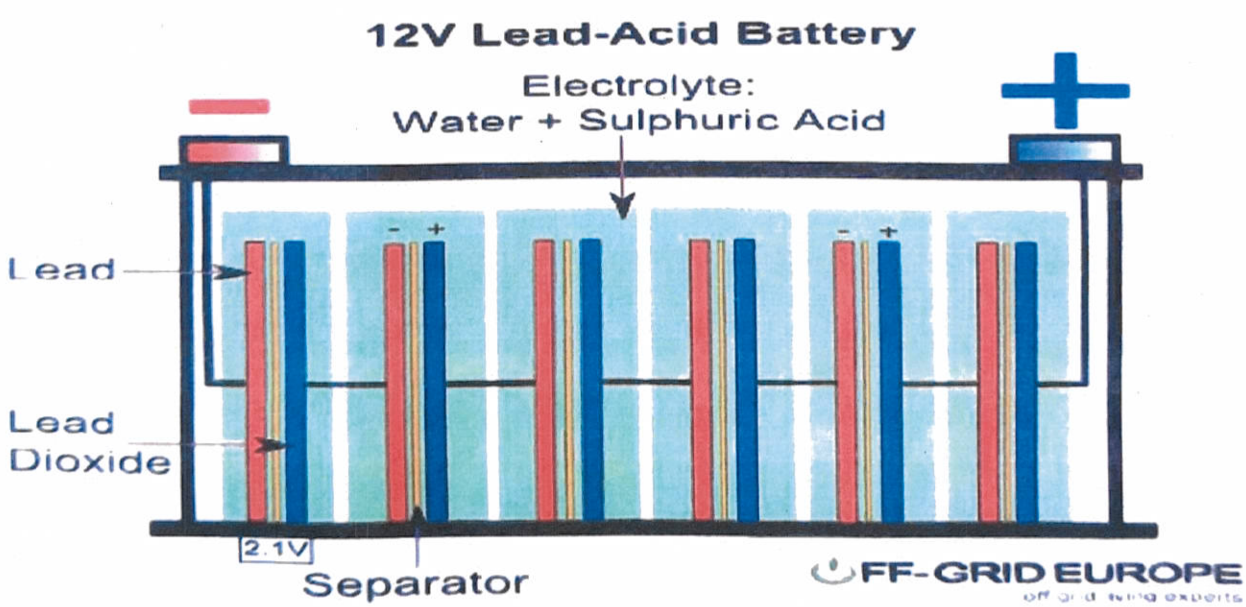
a) Inexpensive and simple to manufacture.
b) It is reliable and well-understood technology, when used correctly, lead-acid is durable and provides dependable service.
c) The self-discharge is among the lowest of rechargable battery systems.
d) Capable of high discharge rates.

Limitations

a) low energy density - poor weight-to-energy ratio limits use to stationary and wheeled applications.
b) Allows only a limited number of full discharge cycles.
c) lead content and electrolyte make the battery environmentally unfriendly.
d) Transportation restrictions on flooded lead acid - there are environmental concerns regarding spillage.



Lead-acid battery chemistry a) during discharging
b) during charging c) A battery prototype.



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