

HARIMOHAN GHOSE COLLEGE

DARKNESS TO LIGHT AND MORE LIGHT



FIRST CYCLE NAAC ACCREDITATION 2024



CRITERION 2 : Teaching-learning and Evaluation

2.3.1. Student centric methods, such as experiential learning, participative learning and problem solving methodologies and ICT- enabled tools

HARIMOHAN GHOSE COLLEGE

J-206 & 208A, PAHARPUR ROAD, GARDEN REACH, KOLKATA-700024

Website: harimohanghosecollegekol24.ac.in e-mail : phmgcollege@gmail.com

Ref. No.....

Date

2.3.1: Student centric methods, such as experiential learning, participative learning and problem-solving methodologies are used for enhancing learning experiences and teachers use ICT- enabled tools including online resources for effective teaching and learning process:

EXCURSION BY VARIOUS DEPARTMENTS

**A Visit to “Zero Gallery” of Ramakrishna Mission Residential College, Narendrapur
(Mathematics Dept.) on 6th June, 2022**




Principal
Hari Mohan Ghose College
J206 & 208A, Paharpur Road
Kolkata-700 024

HARIMOHAN GHOSE COLLEGE

J-206 & 208A, PAHARPUR ROAD, GARDEN REACH, KOLKATA-700024

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ESTD.-1963

Ref. No.....

Date

Attendance Sheet

EDUCATIONAL EXCURSION ORGANIZED BY THE DEPARTMENT OF MATHEMATICS

VENUE:- RAMKRISHNA MISSION RESIDENTIAL COLLEGE, KOLKATA
DATE:- 06/06/2022

LIST OF PARTICIPANTS

Sl. No.	Name of the Student	College Roll No.	Semester	Signature
1.	MANJU SHAN	813	VI	Manju Shan 06/06/22
2.	ARZOO KHANAM	815	VI	Arjoo Khanam 06/06/22
3.	MD REYAN KHAN	801	IV	Md. Reyan Khan 06/06/22
4.	MD SAHEEL	802	IV	Md. Saheel 6/6/22
5.	ASHI			
5.	MD UMAR FAROOQUE	804	IV	md. Umar Farooque 06/06/22
6.	MD. BASSHAR	806	IV	M. Basshar 06/06/22
7.	KUNDAN KUMAR SINGH	808	IV	Kundan Kumar Singh 06/06/22
8.	DANISTA SAKIL	805	IV	Danista Sakil 6/6/22
9.	SABINA PARVEEN	901	IV	Sabina Parveen 6/6/22
10.	MD. IBRAHIM HAFEEZ	821	II	Md. Ibrahim Hafiez 06/06/22

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Ref. No.....

Date

A Visit to Eco Park by English Department on 16.08.2019




Principal
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Ref. No.....

Date

A visit to Dooars by Physiology Department on 05.04.2023



Principal
 Principal
 Harimohan Ghose College
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 Kolkata-700 024

HARIMOHAN GHOSE COLLEGE

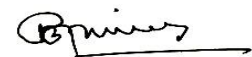
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Date

A Visit to Rabindra Bharati Museum by Education Department on 11.04.2019



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Date

A Visit to Tona Organic Farm by Commerce Department on 08/05/2023




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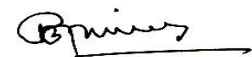
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Date

A visit to Charak Udyan, Acharya Jagadish Chandra Bose Indian Botanic Garden, Shibpur, Howrah, West Bengal and the Ethnobotany Section under The Botanical Survey of India (B.S.I.) by Botany Department on 21.09.22



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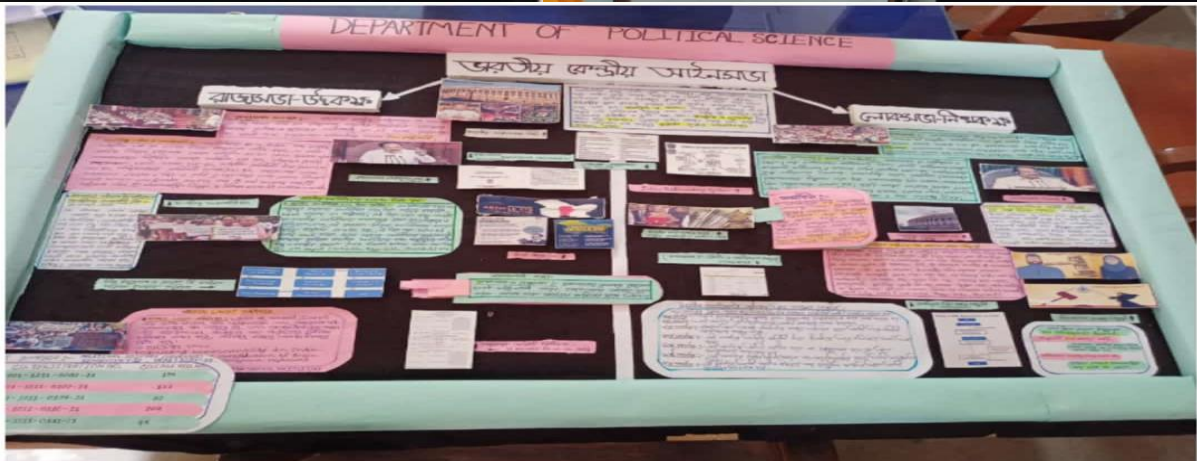
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Ref. No.....

Date

POSTER MAKING EVENT (POLITICAL SCIENCE DEPARTMENT)

28/02/2023




Principal
Harimohan Ghose College
J206 & 208A, Paharpur Road
Kolkata-700 024

HARIMOHAN GHOSE COLLEGE

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ESTD.-1963

Ref. No.....

Date

DEPARTMENTAL SEMINAR (DEPARTMENT OF URDU) ON 25/11/22

ESTD 1963

 **HARIMOHAN GHOSE COLLEGE**

DEPARTMENT OF URDU
DEPARTMENTAL SEMINAR

DATE: 25.11.2022 & TIME:1:30 P.M

Topic
FILM AUR SAMAJ




Principal
Harimohan Ghose College
J206 & 208A, Paharpur Road
Kolkata-700 024

HARIMOHAN GHOSE COLLEGE

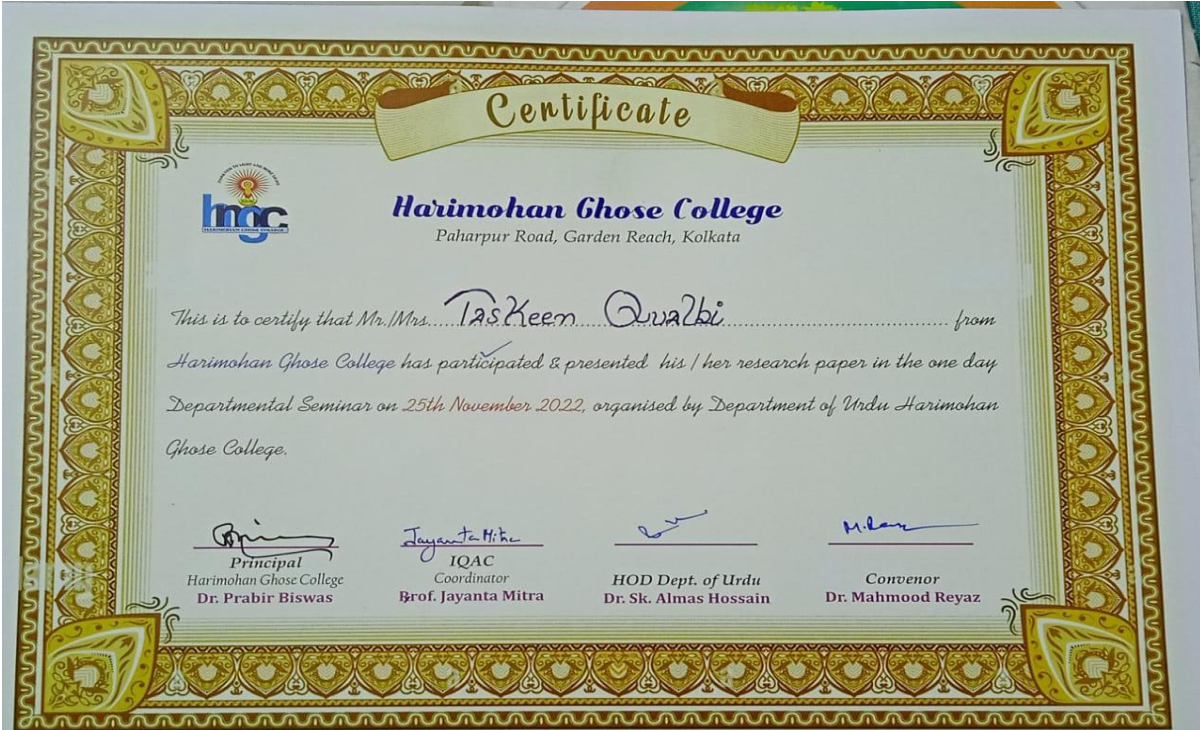
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ESTD.-1963

Ref. No.....

Date

HARIMOHAN GHOSE COLLEGE
DEPARTMENTAL SEMINAR
PAPER - PRESENTS
DEPT of URDU
PART-1
 TOPIC: Effects of Film on Society
 On 25.11.2022
 At- Smart Class Room

Sl	NAME	SPEECH	ROLL - NO
1	Mahmooda Shiroen	Ex - Student (MTBRUI of Teachers)	
2	Aishad	Ex - student	
3	Fazida Khatoun	Ex - student (HMCIC Teachers)	
4	Tabbusum Nisa	Ex student	
5	Azhasi	Ex student	
6			
7	Abid Buraishi	speech	Sem 5th (145)
8	Taskeen Qalbi	"	Sem 5th (130)
9	Azmat Pasveen	"	Sem 5th (149)
10	Ashifa Naaz	"	Sem 5th (123)
11	Ashifa Khanum	"	Sem 5th (120)
12	Aishad Alam	"	Sem 3rd (80)
13	Nadira Aslam	"	Sem 3rd (40)
14	Sabina Khatoun	"	Sem 3rd (29)
15	Istiyaque Alam	"	Sem 1st (14)
16	Zaemat Khatoun	"	1st sem ()



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Date

Harimohan Ghose College
Departmental Seminar
DRAMA

Sl	Name	Drama	Roll NO
1	Naalora Islam	"	(116) 3rd sem
2	Sharifa	"	(176) 3rd
3	Habiba Rasool	"	(87) 3rd
4	Sabina Khatun	"	(29) 3rd
5	Ashyama Khatun	"	(140) 3rd
6	Nilufer Naz	"	(145) 3rd
7	Safdar Raza	"	(128) 5th
8	Taskeen Qalbi	"	(190) 5th

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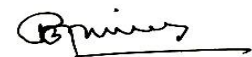
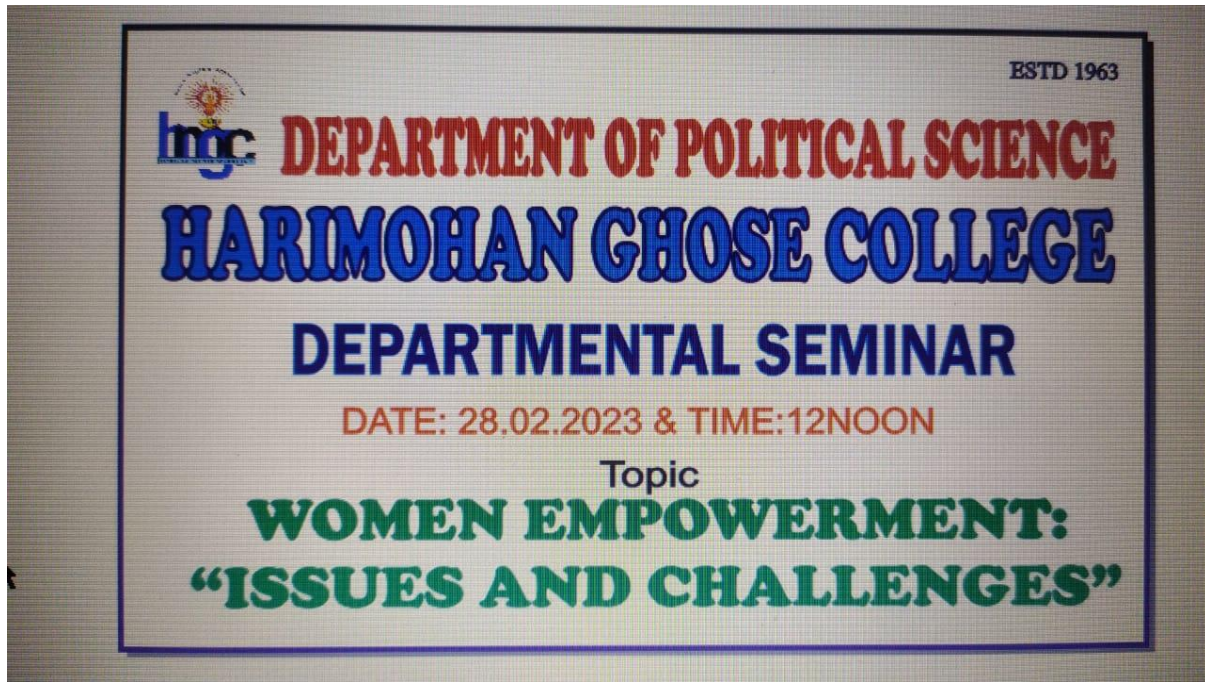
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Date

DEPARTMENTAL SEMINAR (POLITICAL SCIENCE DEPARTMENT) ON

28/02/23



Principal
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HARIMOHAN GHOSE COLLEGE

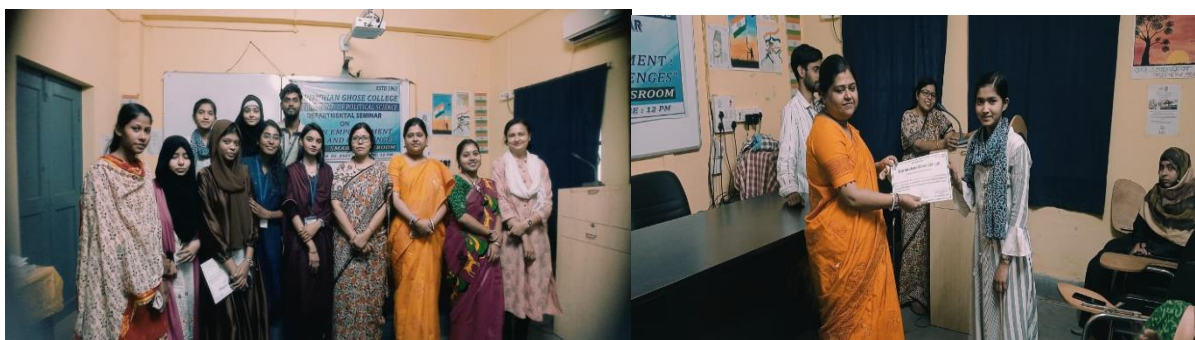
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QUIZ CONTEST BY POLITICAL SCIENCE DEPARTMENT ON 20.06.2022




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FILM SCREENING ON BABASAHEB AMBEDKAR'S LIFE ON 25.05.2022




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Ref. No.....

Date

DEBATE COMPETITION (YOUTH PARLIAMENT) ON 16.09.2022



**WEST BENGAL YOUTH PARLIAMENT COMPETITION
SCHEME IN EDUCATIONAL INSTITUTIONS 2022-2023**

**DEPARTMENT OF PARLIAMENTARY AFFAIRS
GOVERNMENT OF WEST BENGAL**

YOUTH PARLIAMENT COMPETITION 2022-23

Venue: **Scottish Church College**
1 & 3, Urquhart Square, Kolkata - 700 006

PARTICIPANT

Name: **AQSHA JAMIL**

College: **HARIMOHAN GHOSH**

Event: **YOUTH PARLIAMENT**

Dept. **ENG.(H)** Semester: **3RD**

Date: 14th & 16th September, 2022


Principal
Harimohan Ghose College
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Pruiya Dey
 Principal
 Harimohan Ghose College
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Date

WALL MAGAZINE BY URDU DEPARTMENT ON 25.11.22



WALL MAGAZINE BY URDU DEPARTMENT ON 25.11.22

شعبہ اردو
 تاریخ: 25-11-2022

میر تقی میر

لفظ و معنی کے جادوگر شاعر، مثال میر تقی میر اور غزل کا وہ آسب ہیں کہ جو اس کی جگہ میں آجاتا ہے، نازنگی وہ اس کا مبع رہا ہے۔ میر تقی میر آگرہ میں 1722ء میں پیدا ہوئے ان کے والد کا نام میر علی تھا لیکن علی مٹھی کے نام سے مشہور تھے۔ میر نے ابتدائی تعلیم والد کے دوست سردار انانک سے حاصل کی مگر مزید تعلیم سے پہلے جب میر اپنی نو برس کے تھے وہ چل سے تب ان کے بعد ہی ان کے والد نے خود تعلیم و تربیت شروع کی مگر چند ماہ کے بعد ان کا بھی انتقال ہو گیا۔ ان کے سوتیلے بھائی محمد حسن نے اچھا سلوک نہ کیا۔ میر تلاش معاش کی فکر میں دلہی دیپ لہر ایک نواب ہاں ملازم ہو گئے۔ نواب کے فوٹ ہونے کے بعد میر آگرہ لوٹ آئے۔ بالآخر میر گوشہ عافیت کی تلاش میں لکھنؤ روانہ ہوئے وہاں ان کی شہزادی کی دھڑی بچ گئی۔ میر نے اردو کے چھ دریاں مرتب کئے جن میں غزلوں کے علاوہ فوائد، مثنویاں، رباعیات وغیرہ شامل ہیں۔ مثنوی میں ان کی قیوت گنا میں معاملات مثنوی مور نامہ دریاں شامل ہیں۔ میر کی وفات 1810ء میں لکھنؤ میں ہوئی

پتا چتا ہونا حال ہمارا جانے سے
 جانے نہ مانے گل ہی نہ مانے لہر تو سارا جانے

آگ تھے ابتدا عشق میں تہم
 اب تو ہیں خاک انشہا ہے یہ

پستے ہو روتے جگہ کر خم سے
 تھیر رکھی ہے نمے کیا ہم سے

عشق کیا کیا تمہیں دکھاتا ہے
 آہ نم لہی تو اک نظر دیکھو

راہ دور عشق میں رو رہا ہے کہا
 آگے آگے رکھیے ہونا ہے کیا

ناکی اس لبوں کی کیا پیچھے
 پتلی ایک گلاب کی سی ہے

آئے ہیں سبیر کو بنائے خفا سے آج
 شاید بگر گئی ہے کچھ اس سے وفا کے ساتھ

عام کے سارے اور
 دل پر ہے میرا غل کا
 میر تقی میر
 میر تقی میر
 میر تقی میر

بارہنیا میں لہو نرزدہ یا شاد رہو
 ایسا کھر کے چلوں کہ بہت یاد رہو

نرم میں جو تر لہو نہیں
 شمع روشن کے مذہب نور نہیں

بہت آرزو تھی گلی کی تری
 سویاں سے ابو میں نہا کر پھلے

کیا کہوں تم سے میں کہ کاسے عشق
 جاں کا رنگ ہے بلا ہے عشق

سرخن مشتاق سے عالم ہمارا
 بہت عالم کرے گا تم بھلا

یا تقویٰ ہاتھ لوجھ مانند جام سے
 یا تقویٰ دور ساق چلو میں نشے میں ہوں

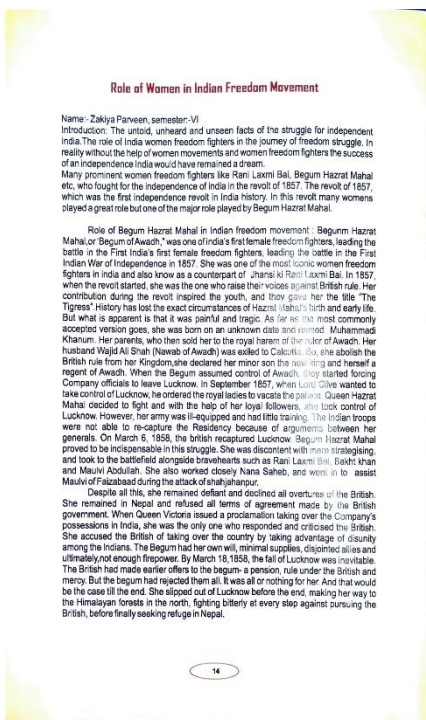
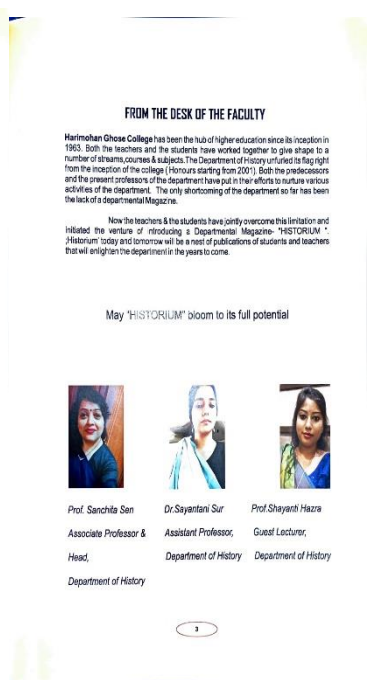
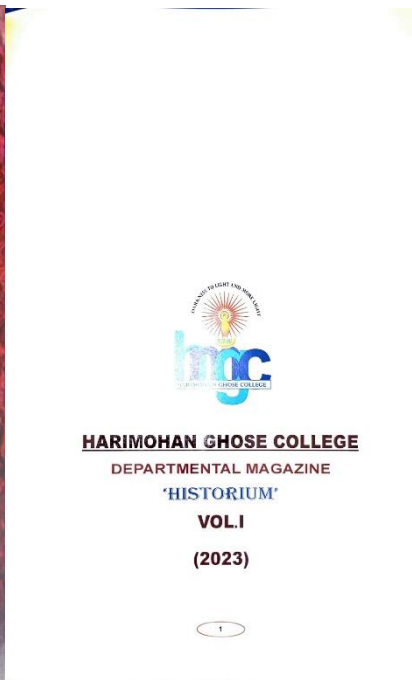
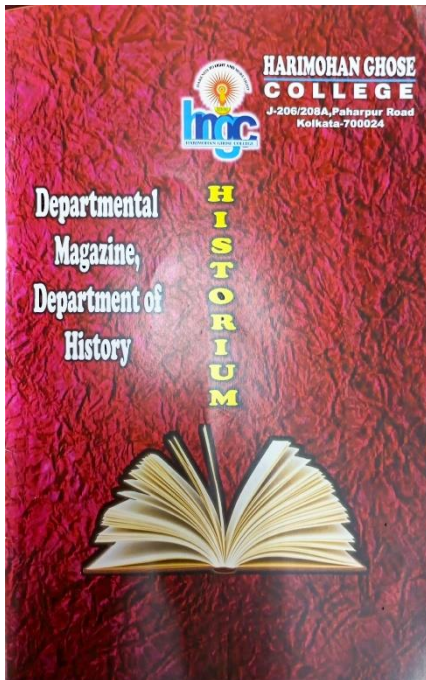
میر سے بوجھا جو عاشق ہو تم
 کہہ سکتا ہے میر تقی میر


 Principal
 Harimohan Ghose College
 J206 & 208A, Paharpur Road
 Kolkata-700 024

Ref. No.....

Date

DEPARTMENTAL MAGAZINE BY DEPARTMENT OF HISTORY (2023)



B. Prasad
Principal
Harimohan Ghose College
J206 & 208A, Paharpur Road
Kolkata-700 024

HARIMOHAN GHOSE COLLEGE

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Date

WORKSHOP BY DEPARTMENT OF ENGLISH (10.05.2023)



**THEATRE – AN ODYSSEY
(WORKSHOP CUM LECTURES)**

Organised By:
**DEPARTMENT OF ENGLISH
HARIMOHAN GHOSE COLLEGE**

**SPEAKERS : RATAN KUMAR DAS
& SUSHANTA DUTTA(NANDIKAR)**

**DATE : 10.05.2023
TIME : 10 am — 5 pm
VENUE : SMART CLASSROOM**

**THEATRE – AN ODYSSEY
(WORKSHOP CUM LECTURES)**

Organised By:
**DEPARTMENT OF ENGLISH
HARIMOHAN GHOSE COLLEGE**

**SPEAKERS : RATAN KUMAR DAS
& SUSHANTA DUTTA(NANDIKAR)**

**DATE : 10.05.2023
TIME : 10 am — 5 pm
VENUE : SMART CLASSROOM**




Principal
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Ref. No.....

Date

10.05.23 Theatre: An Odyssy
 (Workshop cum Lecture)
 2nd Semester (Hons) - 50%

Registration
 (for 10th May 2023)

1. ANDLIDA FIRDAUS
2. ZERAA KHATOON
3. SANA PARVEEN
4. SALIYA KHATOON
5. Nandani Gupta
6. Hamad Rahman (AB)
7. Saadiqa parveen
8. Kashan-e-Zannaf
9. Shumaila Abid
10. Manbasha Naushad
11. Shahin parveen
12. Shadman Zareen
13. Falak Jahan
14. Md. Akteshan
15. Sajid Ali Ansari
16. Mehvish Sanwar
17. Sana Warsi
18. Siyara
19. Nargis (AB)
20. Samia Parveen
21. Tahreem Fatema
22. Nikhat Shahjahan
23. Haroon Jahan
24. Nawal Raza
25. Md. Faizan Anwar
26. Shahzan Siraj

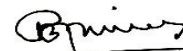
Theatre: An Odyssy
 (Workshop cum Lecture)
 4th Semester (Hons).

1. Eriam Haque.
2. Nigar Anjum
3. Chahin Khan.
4. Gulafsha Parveen
5. Puja Gupta.
6. Neha Ali
7. Saharaz Parveen
8. Saba Parveen
9. Ejara Khatoon.
10. Javeria Maria
11. Rehana Khatoon.
12. Hadisha Khatoon.
13. Nalay Parveen.
14. Roshni Bano
15. Asfa Mahboob.
16. Uzoni Farheen.

6th Semester 2023 (Hons)
 Registration for Workshop on 10th May 2023: 50% partidant

1. Adous Latif	17. Juleka Khatun
2. Tahera Khatoon.	18. Sima Haider
3) Redala Khushnood Haider	19. Puja Kumari
4) Junaid Ahmed.	20. Isha Kumari Dhanraj
5) Altaf Khan.	21. Shruti Kesari ^{Keshari} Keshari
6) Mobassara Nishar.	
7) Muskan Khatoon	
8) Dipti Shaw	
9) Zeba Parveen	
10) Muskan	
11) Tanin Aziz	
12) Sahiba Israil	
13) Rafat Rizwan	
14) Sidra Feroz (AB)	
15) Rakhsan Anjum	
16) Jesmin Khatun	

(PARTICIPANTS OF THE WORKSHOP)



Principal
 Harimohan Ghose College
 J206 & 208A, Paharpur Road
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ESTD.-1963

Ref. No.....

Date

CULTURAL PROGRAMMES IN COLLEGE



(BASANTA UTSAV 2018-19)



(RABINDRA JAYANTI 2021-22)


Principal
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Kolkata-700 024

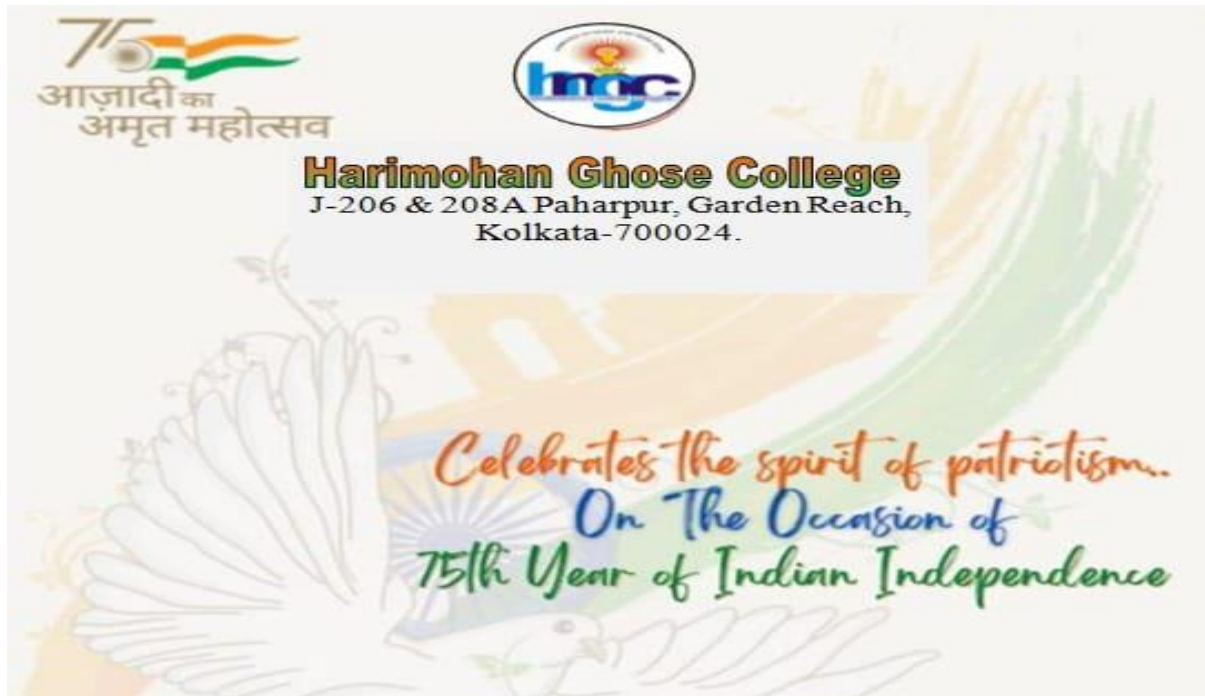
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(AZADI KA AMRIT MAHOTSAV CELEBRATION-12.08.2022)


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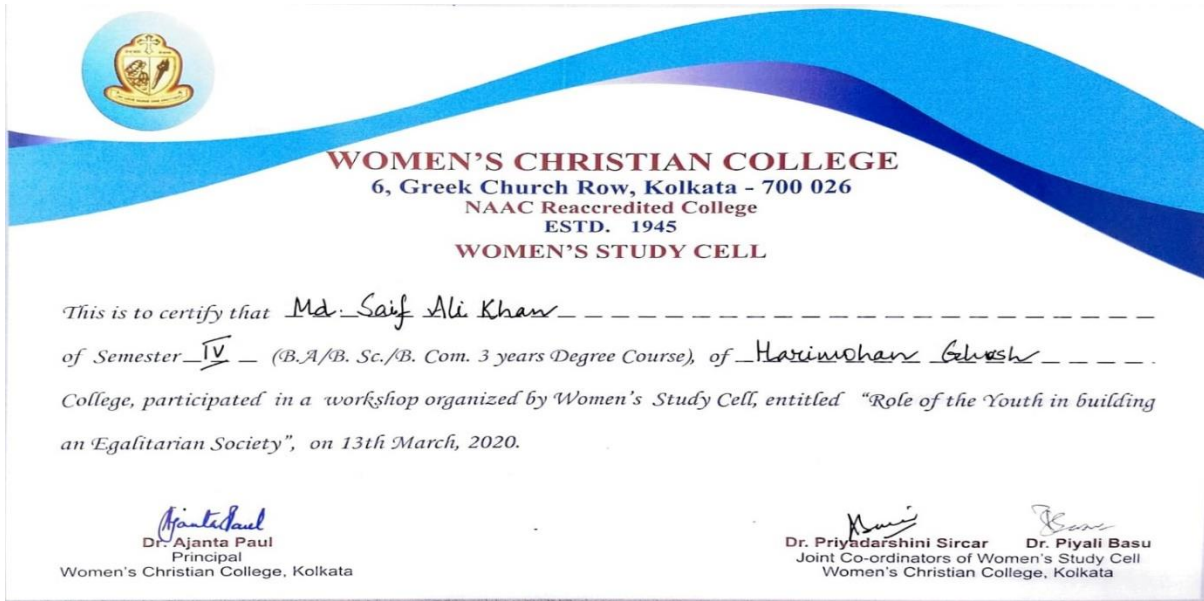
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PARTICIPATION OF OUR STUDENTS IN OTHER INSTITUTIONS

PARTICIPATION IN WORKSHOP AT WOMEN'S CHRISTIAN COLLEGE (13.03.20)



PARTICIPATION IN THEATRE WORKSHOP IN WEST BENGAL URDU ACADEMY (15.12.2021 & 16.12.2021)



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Dated.....20

*Drama Workshop organized by WBVA
on 15 & 16 Dec. 2021*

- ① SAJDA KHATOON
- ② ZEENAT PARVEEN
- ③ MUSKAN FATIMA
- ④ UMMEE SALMA
- ⑤ ASSMEN KHATOON
- ⑥ REHANA KHATOON
- ⑦ HUMRAZ BANO
- ⑧ AFREEN KHATOON
- ⑨ SAHL ALI KHAN
- ⑩ AFREEN KHATOON
- ⑪ ZARINA KHATOON
- ⑫ TASKIN QUALBI
- ⑬ SAJID AKHTAR
- ⑭ SHAHINA PARVEEN
- ⑮ SHAHANA PARVEEN
- ⑯ FARHA NAAZ.

Allowed 16 students
B. Prasad
13-12-2021

Principal
Harimohan Ghose College
J206 & 208A, Paharpur Road
Kolkata-700 024

B. Prasad

Principal
Harimohan Ghose College
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PARTICIPATION IN 'MOBILE APP LITERACY' COURSE



PARTICIPATION IN SOCIAL AWARENESS PROGRAMME




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PARTICIPATION IN QUIZ COMPETITION



VIDYA JYOTHI INSTITUTE OF TECHNOLOGY
(An Autonomous Institution)
Accredited by NBA & NAAC, Approved by AICTE and Permanently Affiliated to JNTUH
Aziz Nagar, C.B. Post, Hyderabad - 500075

DEPARTMENT OF ENGLISH (HUMANITIES AND SCIENCES)

**CERTIFICATE
-OF APPRECIATION-**

This is to certify that **SIREEN PARVEEN, B.Sc. Mathematics Honours (6th Semester)** from **HARIMOHAN GHOSE COLLEGE** has participated in Online Quiz '**ENGLISH DISCRETE-POINT TEST**' organised by Department of English, Vidya Jyothi Institute of Technology, Hyderabad, on 5-4-2021, with a score of **100%**.

Certificate ID: KMRA9G-CE007567



Dr. Indira Priyadarshini
convenor


Prof. M. Rajendra Prasad
HoD-H&S



Dr. E Saibaba Reddy
Director




Dr. A. Padmaja
Principal

Made for free with Certify'em




**JAHNVIS MULTI FOUNDATION'S
VANDE MATARAM DEGREE COLLEGE
OF ARTS, COMMERCE & SCIENCE (CS & IT)**
(AFFILIATED TO UNIVERSITY OF MUMBAI)

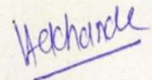







CERTIFICATE OF APPRECIATION

This is to certify that **Mr. /Ms./ SIREEN PARVEEN** of **Harimohan Ghose College** has participated in the "Intercollegiate Online Quiz Competition on **Chemistry**" organized by Department of Chemistry and IQAC of JMF's Vande Mataram Degree College, Dombivali (West) on 5/15/2020.
Percentage Secured: 92% Certificate I'D: YTLOA8-CE000095


Mrs. Amrita Singh
HOD, Chemistry


Mrs. Vanita Lokhande
IQAC Coordinator


Mrs. Prerana R. Kolhe
Secretary of JMF's


Prin. Dr. Rajkumar M. Kolh
Founder President of JMF's


 Principal
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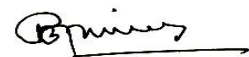
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PARTICIPATION IN YOGA COMPETITION (DEBJANI PATRA)



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ICT FACILITIES IN COLLEGE FOR TEACHING-LEARNING

TEACHRES USING WI-FI IN LAPTOP/COMPUTER IN TEACHERS' ROOM




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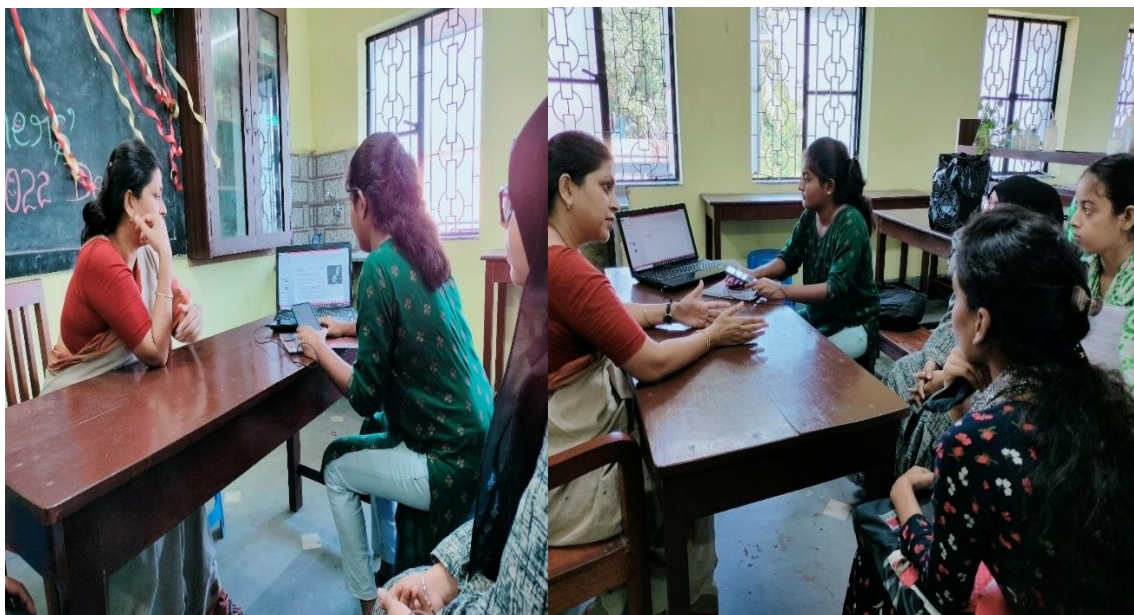
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PROJECTOR IN THE SMART CLASSROOM



ICT ENABLED CLASSROOM (BOTANY DEPARTMENT)




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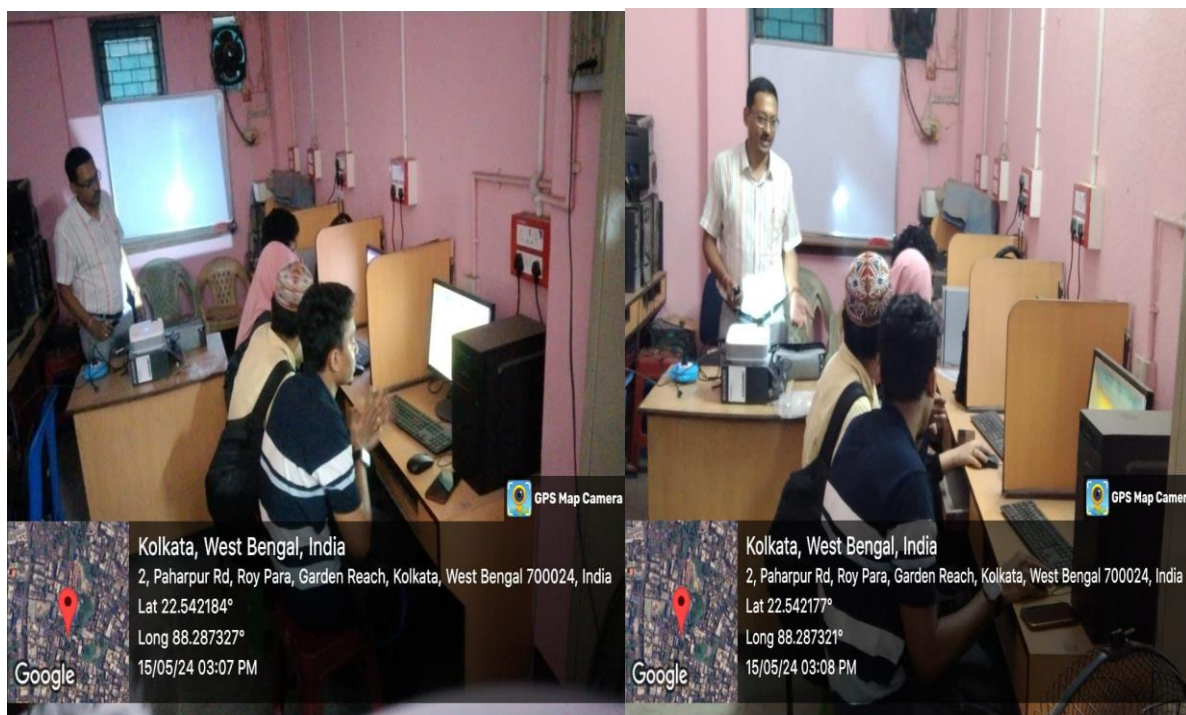
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USE OF PROJECTOR IN PHYSIOLOGY LABORATORY



COMPUTER LAB (COMMERCE DEPARTMENT)



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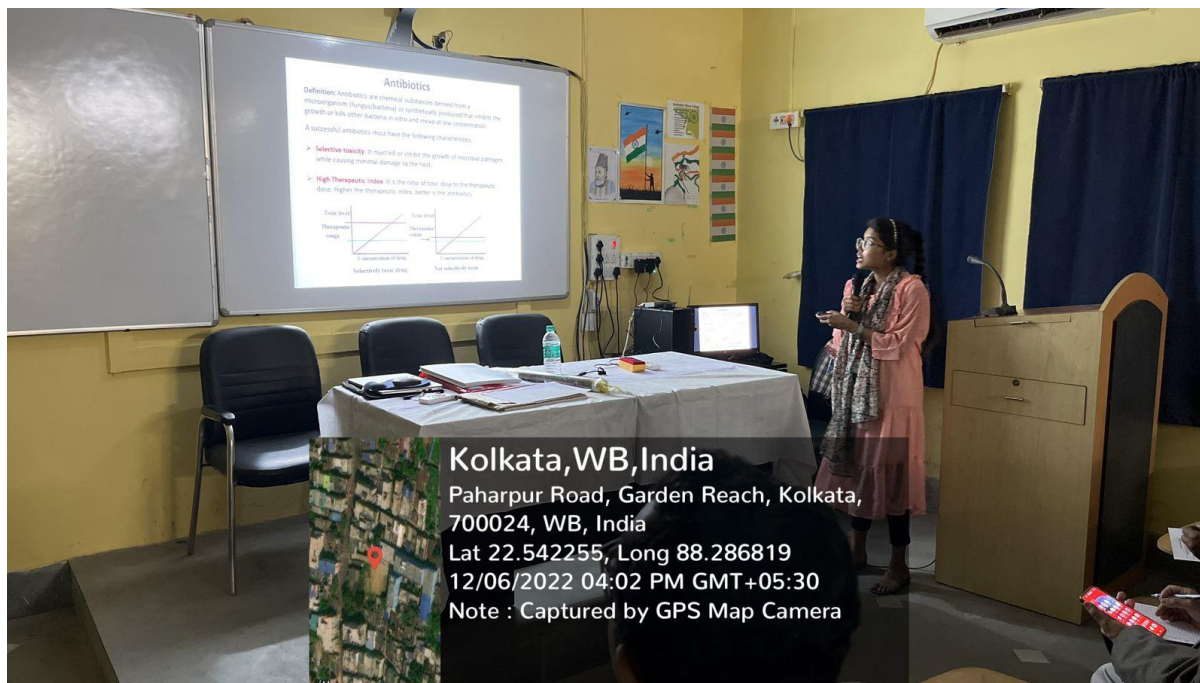
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STUDENT PRESENTATION WITH PPT IN SMART CLASSROOM



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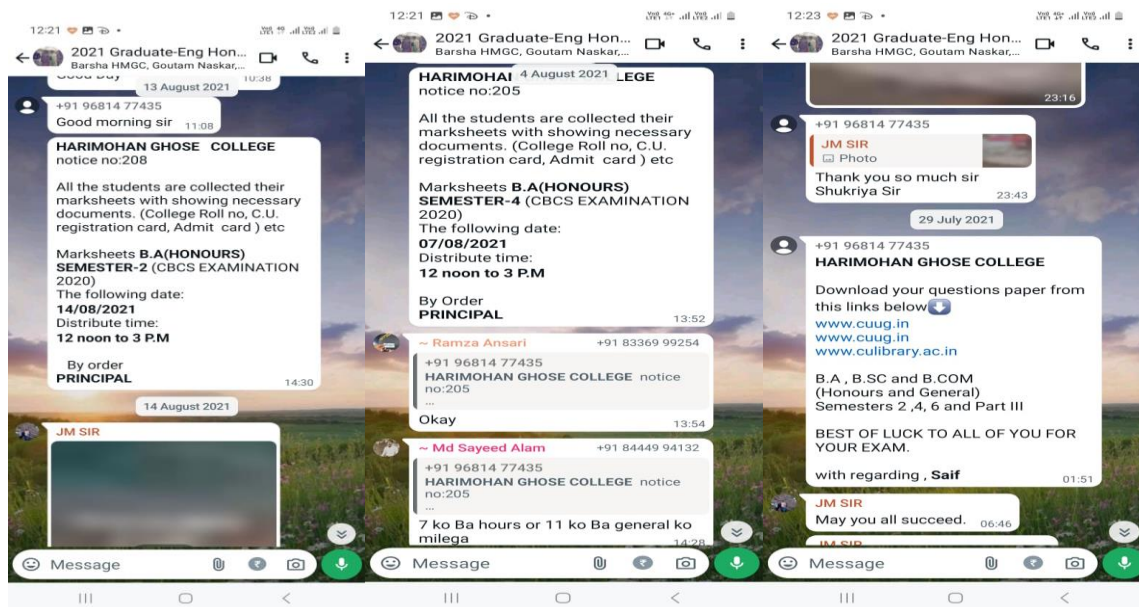
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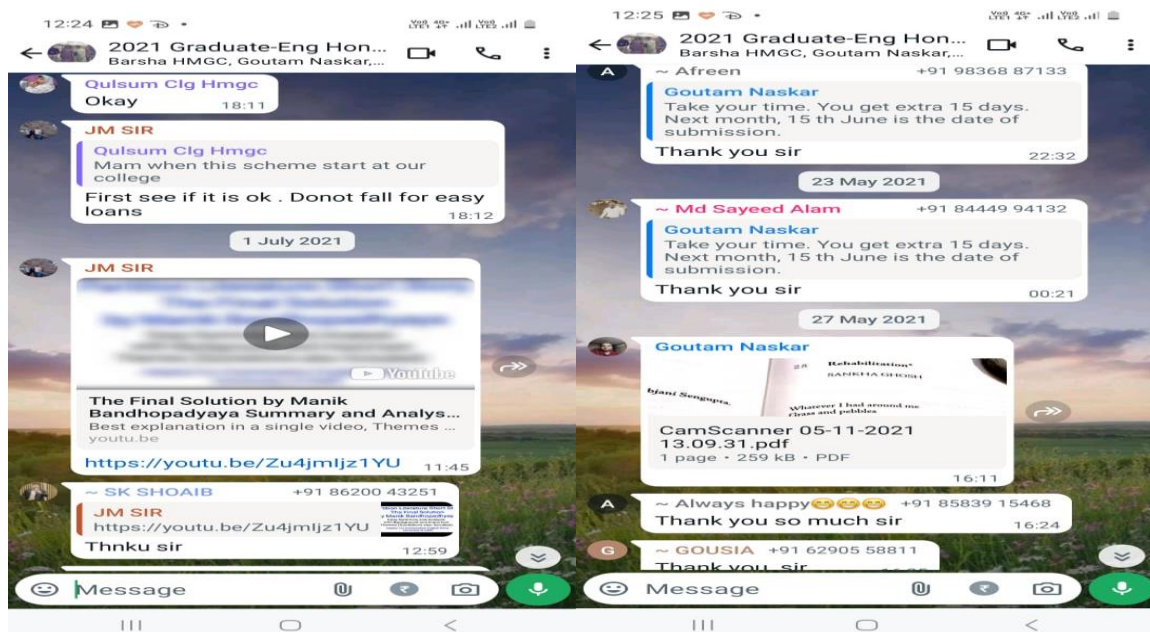
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SHARING INFORMATION THROUGH WHATSAPP GROUP (DURING PANDEMIC AND AFTERWARDS)



SHARING STUDY MATERIALS THROUGH WHATSAPP (YOUTUBE LINKS, PDF FILES AND OTHER MATERIALS PREPARED BY TEACHERS)



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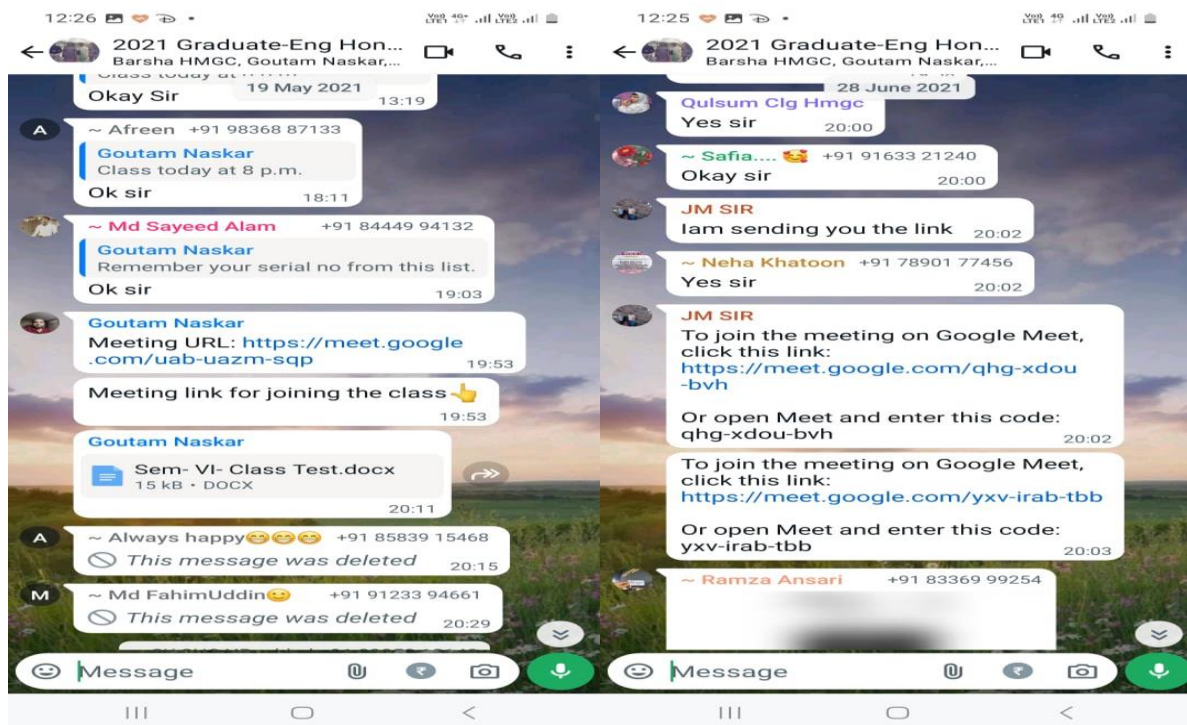
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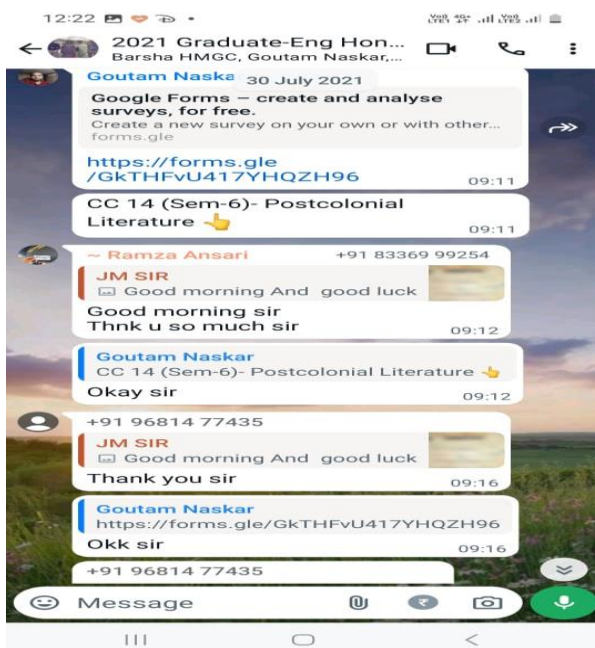
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GOOGLE MEET LINKS FOR ONLINE CLASS (DURING PANDEMIC & AFTERWARDS)



GOOGLE FORMS FOR COLLECTING INFORMATION, FEEDBACK & ASSIGNMENTS



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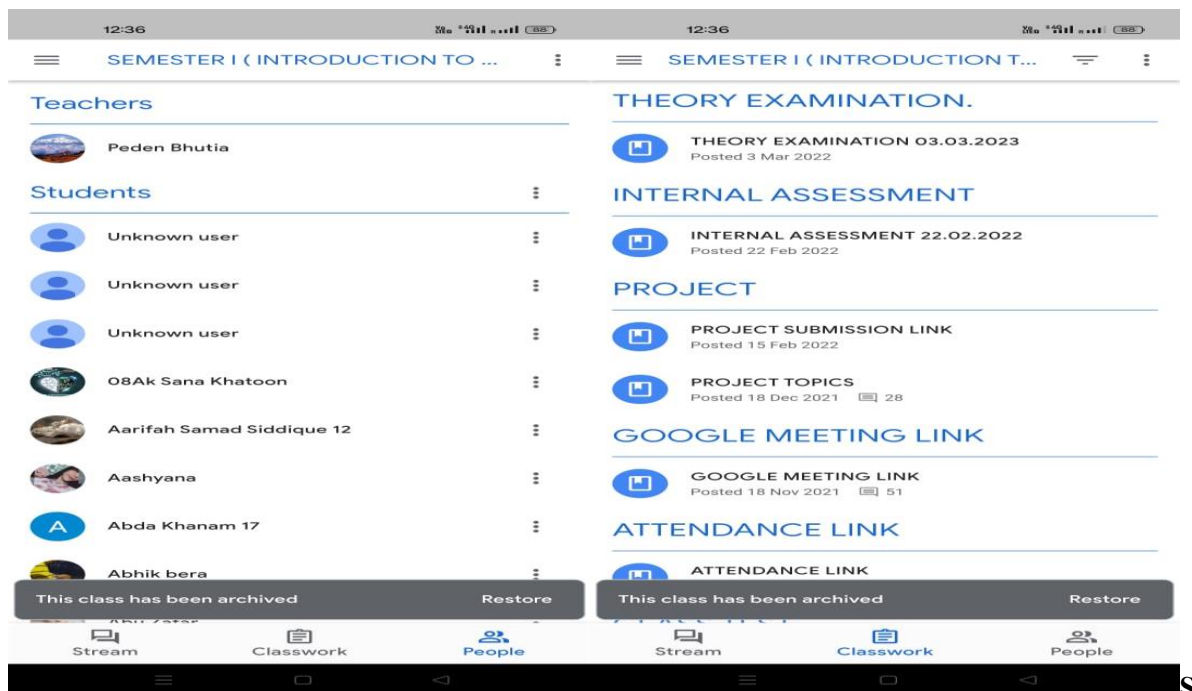
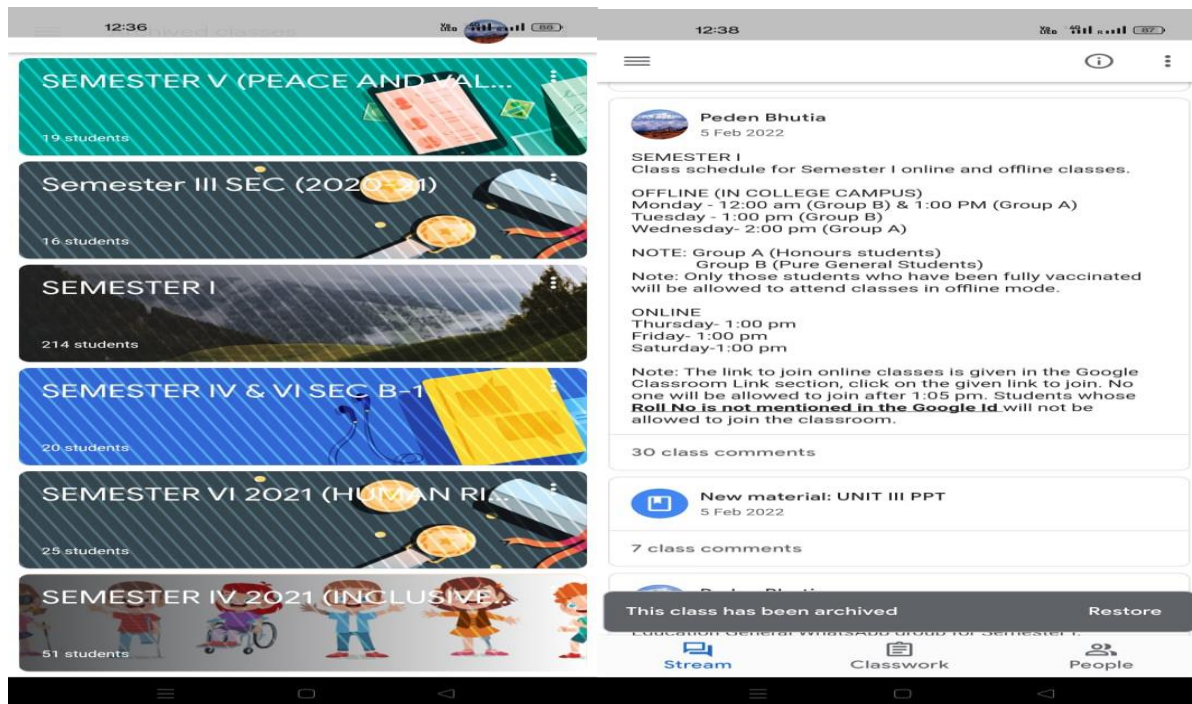
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PROBLEM SOLVING METHODOLOGIES

2021-22

(CHEMISTRY DEPARTMENT)

UNIVERSITY OF CALCUTTA

COLLEGE Roll No. :- 830

C.U Roll No. :- 223021-11-0001

C.U REG No. :- 021-1211-0153-22

SUBJECT :- CHEMISTRY PRACTICAL.

SEMESTER :- III (B.Sc. Hons.)


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PAGE NO : 09 DATE :		
* WET TEST FOR ACID RADICALS :->		
Experiment	Observation	Inference
(i) 2 ml of the aq. solution of the sample is acidified with dil. HCl & boil of CO_2 and the BaCl_2 solution is added.	(i) No heavy white ppt. ^{observed} (insoluble in HCl)	(i) SO_4^{2-} ion is absent.
(ii) To 2 ml of the aq. solution of the sample dilute HNO_3 is added, boil of CO_2 and AgNO_3 solution is added.	(ii) a. NO curdy white ppt. b. No pale yellow ppt. c. No pale yellow ppt.	a. Cl^- ion is absent b. Br^- ion is absent c. I^- ion is absent.
(iii) In ^{aqueous} Fe^{3+} sample solution a few drops of solution of sodium nitroprusside is added.	(iii) No violet or pink colouration observed	(iii) S^{2-} ion is absent.
(iv) Dissolve the sample in dil. HNO_3 and then 2 ml of ammonium molybdate sol ⁿ is added and warmed in a test tube.	(iv) No curdy yellow ppt. is obtained.	(iv) PO_4^{3-} ion is absent.
(v) A little sample is dissolved in alcohol and treated strongly.	(v) Green-edge flame appears	(v) H_3BO_3 or $\text{B}_2\text{O}_3^{3-}$ may be present.
Teacher's Signature		

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PAGE NO: 10 DATE:		
Experiment	Observation	Inference.
(vi) A little amount of sample is dissolved in alcohol then 2-3 ml of conc. H_2SO_4 is added & then heated on a flame.	(vi) Green edge flame appears.	(vi) Bi^{3+} present and confirmed.
(vii) On a sample solution one drop of sulphuric acid is added with a drop of α -naphthylamine.	(vii) No red colouration	(vii) NO_2^- ion is absent
(viii) To the sample sol ⁿ add w/c with one drop of sulphuric acid and drop of α -naphthylamine.	(viii) No red colouration	(viii) NO_2^- ion is absent.
<u>* DRY TEST FOR BASIC RADICALS :-</u>		
Experiment	Observation	Inference.
1. Dry test tube heating: A little sample is taken in a clean dry test tube and then heated at first gently and then strongly.	Residue turns black	Cu^{2+} , Al^{3+} , Mn^{2+} may be present.
Teacher's Signature		

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Experiment	Observation	Inference
<p>2. Charcoal Black Test :</p> <p>A little amount of sample is mixed with twice its weight of Na_2CO_3, this mix is placed inside a charcoal groove with a drop of water and then heated in the reducing flame by blow pipe.</p>	Residue turns black.	Cu, Ni, Mn salt may be present.
<p>3. Cobalt Nitrate Test :</p> <p>A little amount of sample is taken in a groove of charcoal black and moistened by adding 3-5 drops of water and then 1-2 drops of dil. cobalt nitrate solⁿ is added then again heated strongly in oxidising flame.</p>	No grey residue	Ca^{2+} , Ba^{2+} , Sn^{2+} are absent.
<p>4. Flame Test :</p> <p>A clean pt. wire is first moistened with conc. HCl and then a little of the powder sample is touched at the tip of the wire & then hold it in flame.</p>	Blue flame with green edge.	Cu^{2+} , BO_3^{3-} and H_2BO_3 may be present.

Teacher's Signature _____

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Test with HCl extract :->		
Experiment	Observation	Inference.
I. A few amount of sample is dissolved in dil. HCl solution and is divided in three parts-		
(i) Dilute 1 st part of the sol ⁿ and then $K_4[Fe(CN)_6]$ sol ⁿ is added.	(i) No deep blue ppt or sol ⁿ or prussian blue.	(i) Fe-salt is absent
(ii) To the 2 nd part of extract dil. H_2SO_4 is added.	(ii) No white ppt.	(ii) Ba^{2+} , Sr^{2+} , Pb^{2+} are absent.
(iii) To the 3 rd extract K^+ solution is added.	(iii) No yellow ppt.	(iii) Pb^{2+} is (yellow) absent.
Test with Nitric Acid extract :->		
Experiment	Observation	Inference.
I. Dissolve the sample is dil. HNO_3 & then divide the solution into three parts-		
(i) Add to 1 st part of the nitric acid solution, a pinch of $NaBiO_3$.	(i) Pink colouration does not appears.	(i) Mn^{2+} is absent
(ii) Alkaline the 2 nd part of extract with NH_4OH and then DMG is added.	(ii) Rose red ppt.	(ii) Ni^{2+} is present & confirmed.
(iii) Alkaline the 3 rd part with NH_4OH and then acidify with acetic acid and $K_4[Fe(CN)_6]$ is added.	(iii) chocolate brown ppt.	(iii) Cu^{2+} is present and confirmed.
Teacher's Signature _____		

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PAGE NO : 13
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Test with NaOH extract :->

Experiment	Observation	Inference
1. A small amount of sample is dissolved in NaOH and then filter & divide it into two parts-		
(i) Heat one parts of the extract with solid ammonium chloride.	No white gelatinous ppt.	Al^{3+} ion is absent.
(ii) Acidify another part with acetic acid and pass H_2S gas.	No white ppt.	Zn^{2+} ion is absent.

Test with NH_4 extract :->

Experiment	Observation	Inference
(i) To an aq. solution of a sample Nessler's reagent is added.	No white ppt.	NH_4^+ is absent.

RESULT :->

Hence the supplied sample "I-46" has BO_3^- as acid radical and Ni^{2+} and Cu^{2+} as basic radical were present and confirmed.

Teacher's Signature *Ghose* 22/4/2022

Ghose

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2022-23

(MATHEMATICS DEPARTMENT)

The plane: Name: Shreyash Khatun
Roll No: 810 (Form 12)

A plane is a surface such that if any two points be taken on it, the straight line joining them wholly lies on the surface.

Note:

- 1) A linear equation x, y, z represent a plane, namely $ax + by + cz + d = 0$, where a, b, c are the d.r.s of normal to the plane.
- 2) Equation of a plane passing through the point $P(x_1, y_1, z_1)$ is $a(x - x_1) + b(y - y_1) + c(z - z_1) = 0$.
- 3) Equation of a plane parallel to the co-ordinate axes:-

Let the equation of the plane be $ax + by + cz + d = 0$ — (i)

Let the plane (i) be parallel to x -axis then the normal to the plane is perpendicular to x -axis.

$\therefore a \cdot 1 + b \cdot 0 + c \cdot 0 = 0$
 $\Rightarrow a = 0$

Therefore, the plane becomes $by + cz + d = 0$ which is parallel to x -axis.

Similarly the equation of the plane parallel to y -axis is $ax + cz + d = 0$ and the plane parallel to z -axis is $ax + by + d = 0$.
- 4) Plane passing through three given points:-

Let the given points be (x_1, y_1, z_1) , (x_2, y_2, z_2) and (x_3, y_3, z_3) .

Let the equation of the plane passing through point (x_1, y_1, z_1) be $A(x - x_1) + B(y - y_1) + C(z - z_1) = 0$ — (i)

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It also passes through the point (x_2, y_2, z_2) and (x_3, y_3, z_3)

$$A(x_2 - x_1) + B(y_2 - y_1) + C(z_2 - z_1) = 0 \quad \text{--- (i)}$$

$$A(x_3 - x_1) + B(y_3 - y_1) + C(z_3 - z_1) = 0 \quad \text{--- (ii)}$$

and $A(x_3 - x_2) + B(y_3 - y_2) + C(z_3 - z_2) = 0 \quad \text{--- (iii)}$

Eliminating A, B and C from (i), (ii) and (iii), we get

$$\begin{vmatrix} x_2 - x_1 & y_2 - y_1 & z_2 - z_1 \\ x_3 - x_1 & y_3 - y_1 & z_3 - z_1 \\ x_3 - x_2 & y_3 - y_2 & z_3 - z_2 \end{vmatrix} = 0$$

Question: Find the equation of the plane passing through the point $(2, 2, -1)$, $(3, 4, 2)$ and $(7, 0, 6)$.

Soln:- the equation of the plane passing through the point $(2, 2, -1)$ is, $A(x-2) + B(y-2) + C(z+1) = 0$ --- (i)

It also passes through the point $(3, 4, 2)$ & $(7, 0, 6)$

$$\therefore A(3-2) + B(4-2) + C(2+1) = 0 \quad \text{--- (ii)}$$

$$\text{and, } A(7-2) + B(0-2) + C(6+1) = 0 \quad \text{--- (iii)}$$

Eliminating A, B and C from (i), (ii) & (iii) we get,

$$\begin{vmatrix} x-2 & y-2 & z+1 \\ 1 & 2 & 3 \\ 5 & -2 & 7 \end{vmatrix} = 0$$

$$= (x-2)(14+6) - (y-2)(7-15) + (z+1)(-2+10) = 0$$

$$\Rightarrow 20x - 40 - 8y + 16 + 8z + 12 = 0$$

$$\Rightarrow 20x - 8y + 8z - 68 = 0$$

$$\Rightarrow 5x + 2y - 3z - 17 = 0$$

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HARIMOHAN GHOSE COLLEGE

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ESTD.-1963

Ref. No.....

Date

14.10.22

Q:- A variable plane passes through the point (f, g, h) and meets the axes in A, B, C . If the co-ordinate planes through A, B, C and parallel to the co-ordinate planes meet at P , then show that the locus of P is

$$fx^{-1} + gy^{-1} + hz^{-1} = 1$$

Soln: Let the variable plane be $\frac{x}{a} + \frac{y}{b} + \frac{z}{c} = 1$ — (i)

The plane (i) passes through the point (f, g, h)

$$\therefore \frac{f}{a} + \frac{g}{b} + \frac{h}{c} = 1$$
 — (ii)

Let the plane (i) cuts the x-axis at A , y-axis at B and z-axis at C

\therefore The co-ordinates of the point A, B, C are $(a, 0, 0)$, $(0, b, 0)$ and $(0, 0, c)$ respectively

The equation of the plane parallel to yz -plane i.e. $x=0$ is $x=k$ (constant)

If it passes through the point $A(a, 0, 0)$ we get $k=a$

\therefore The equation of the plane parallel to yz -plane and passes through the point $A(a, 0, 0)$ is $x=a$ — (iii)

Similarly, the equation of the planes parallel to the xz -plane and xy -plane, passes through the point $B(0, b, 0)$ and $C(0, 0, c)$ respectively are $y=b$ — (iv) and $z=c$ — (v)

Let (α, β, γ) be the point of intersection of the planes (iii), (iv) and (v)

$$\therefore \alpha = a, \quad \beta = b, \quad \gamma = c$$

Then (ii), $f\alpha^{-1} + g\beta^{-1} + h\gamma^{-1} = 1$

$$\Rightarrow f\alpha^{-1} + g\beta^{-1} + h\gamma^{-1} = 1$$

\therefore The locus of the point (α, β, γ) is

$$fx^{-1} + gy^{-1} + hz^{-1} = 1$$

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***** Question.** A plane triangle of side a, b, c is placed so that the mid point of the sides are on the axes. Show that the lengths of the intercepts on the axes are given by α, β, γ and that the co-ordinates of the vertices are $(-\alpha, \beta, \gamma), (\alpha, -\beta, \gamma)$ and $(\alpha, \beta, -\gamma)$

Soln: Let ABC be the plane triangle where $BC=a, CA=b$ and $AB=c$ such that the mid-point D of BC, E of AC and F of AB are on the x -axis, y -axis and z -axis respectively.

Let the co-ordinates of the point D, E, F be $(\alpha, 0, 0), (0, \beta, 0)$ and $(0, 0, \gamma)$ respectively.

We have, $DE^2 = \alpha^2 + \beta^2$
 $DF^2 = \alpha^2 + \gamma^2$
 $EF^2 = \beta^2 + \gamma^2$

Now, $DE = \frac{1}{2} AB$, $DF = \frac{1}{2} AC$, $EF = \frac{1}{2} BC$
 $DE^2 = \frac{1}{4} AB^2$, $DF^2 = \frac{1}{4} AC^2$, $EF^2 = \frac{1}{4} BC^2$
 $\Rightarrow \alpha^2 + \beta^2 = \frac{1}{4} c^2$ (i)
 $\alpha^2 + \gamma^2 = \frac{1}{4} b^2$ (ii)
 $\beta^2 + \gamma^2 = \frac{1}{4} a^2$ (iii)

Adding (i), (ii) & (iii)
 $\alpha^2 + \beta^2 + \gamma^2 + \alpha^2 + \beta^2 + \gamma^2 = \frac{1}{4} c^2 + \frac{1}{4} b^2 + \frac{1}{4} a^2$
 $\Rightarrow 2(\alpha^2 + \beta^2 + \gamma^2) = \frac{1}{4} (a^2 + b^2 + c^2)$
 $\Rightarrow \alpha^2 + \beta^2 + \gamma^2 = \frac{1}{8} (a^2 + b^2 + c^2)$ (iv)

(iv) - (i) we get
 $\gamma^2 = \frac{1}{8} (a^2 + b^2 + c^2) - \frac{1}{4} c^2$
 $\gamma^2 = \frac{a^2 + b^2 + c^2 - 2c^2}{8}$
 $8\gamma^2 = a^2 + b^2 - c^2$

(iv) - (ii) gives, $8\beta^2 = a^2 + c^2 - b^2$
 (iv) - (iii) gives, $8\alpha^2 = b^2 + c^2 - a^2$

Proof: Let the co-ordinates of the points A, B, C be $(x_1, y_1, z_1), (x_2, y_2, z_2)$ & (x_3, y_3, z_3) respectively.
 Now F is the mid point of AB , we get $\frac{x_1 + x_2}{2} = 0$
 $x_1 + x_2 = 0, y_1 + y_2 = 0$ (v) & $z_1 + z_2 = 2\gamma$ (vi)

D is the mid point of BC , $x_2 + x_3 = 2\alpha$ (vii) & $z_2 + z_3 = 0$ (viii)

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E is the mid point of AC we get,

$$\frac{x_2 + x_3}{2} = \alpha, \quad y_2 + y_3 = 2\beta \quad \text{--- (xi)}$$

$$z_2 + z_3 = 0 \quad \text{--- (xii)}$$

$$\Rightarrow x_2 + x_3 = 2\alpha \quad \text{--- (x)}$$

Adding (iv), (vii) & (x) we get

$$x_1 + x_2 + x_2 + x_3 + x_3 + x_1 = 2\alpha$$

$$2(x_1 + x_2 + x_3) = 2\alpha \quad \text{--- (xiii)}$$

Adding (v), (viii) & (xi)

$$2(y_1 + y_2 + y_3) = 2\beta$$

$$\Rightarrow y_1 + y_2 + y_3 = \beta \quad \text{--- (xiv)}$$

Adding (vi), (ix), (xii)

$$2(z_1 + z_2 + z_3) = 2\gamma$$

$$\Rightarrow z_1 + z_2 + z_3 = \gamma \quad \text{--- (xv)}$$

By using (v) and (xiii)

$$x_3 = \alpha \quad \text{--- (xvi)}$$

using (xvi)

$$x_2 = \alpha$$

By using (viii) and (xiii)

$$x_1 = -\alpha$$

similarly we get,

$$y_1 = \beta \quad \text{and} \quad z_1 = \gamma$$

$$y_2 = -\beta \quad z_2 = \gamma$$

$$y_3 = \beta \quad z_3 = -\gamma$$

\therefore The co-ordinates of vertices are (α, β, γ) , $(\alpha, -\beta, \gamma)$ and $(-\alpha, \beta, -\gamma)$

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