MAHAVIDYALAYA

(AUTONOMOUS & NAAC RE-ACCREDITED)

(Affiliated to Osmania University)

Nallakunta, Hyderabad

B.Sc. III YEAR SEMESTER V & VI

DEPARTMENT OF CHEMISTRY

(2022-2023)

HINDI MAHAVIDYALAYA, NALLAKUNTA, HYDERABAD
(AUTONOMOUS)
DEPARTMENT OF CHEMISTRY
BOARD OF STUDIES
Academic Year – 2022-2023
Minutes of BOS Meeting

BOS meeting of the Department of Chemistry was held on 5/12/2022

The following members were present

Prof. U. Umesh Kumar	-	University Nominee
Mrs. T. Haritha	-	Chair person
Ms. Anisha Dimple		
Prof. P. Leelavathi	-	Member of BOS
Prof. P.Saritha Reddy	-	Member of BOS
Dr. Kiranmai	-	Member of BOS

Head
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Professor
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Professor
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Department of Chemistry
Andhra Mahila Sabha
Arts & Science college for women
Osmania University Campus

4.1 Welcome address by the chair

The chair welcomed the University Nominee, Chairperson BOS, O.U. Department of Chemistry and Member of B.O.S.

4.2 Previous Meeting details

The CBCS system has been introduced by Osmania University from 2016-17. The theory and practical syllabus of V & VI Semesters of B.Sc., new syllabus , question paper pattern for theory and practical, internal assessment pattern, practical examination scheme and panel of examiners were discussed and approved by all the BOS Members in previous BOS meeting.

4.3 Details of Choice Based Credit System.

Members were informed that TSCHE has referred that from the academic year 2016-17 autonomous institutions have to follow CBCS i.e. From the Academic Year 2016-17 Osmania University has instructed all the Degree colleges including Autonomous Degree colleges to follow CBCS under which after passing the exam student will get the Grade in the Final Result. B.Sc. III YEAR in V and VI semester 4 credits are given for theory paper and 1 credit is given for practical in each semester.

4.4 Discussion and Distribution of Common Core Syllabus for semester V and VI.

i. Members were informed by the chair that Department of Chemistry, Hindi Mahavidyalaya is following common core syllabus prescribed by Osmania University B.Sc. III YEAR in V and VI semesters.

ii. The syllabus comprises of 4 units.

HINDI MAHAVIDYALAYA

(AUTONOMOUS & NAAC RE-ACCREDITED)

BOARD OF STUDIES

B.Sc. III YEAR SEMESTER V & VI

DEPARTMENT OF CHEMISTRY (2022-2023)

COMPOSITION OF THE BOARD OF STUDIES IN AN AUTONOMOUS COLLEGE

I. Composition: Department of Chemistry

1. Head of the Department concerned (Chairman)

Mrs. T.Haritha

II. The entire faculty of each specialization

1. Ms. Anisha Dimple

III. One expert to be nominated by the Vice Chancellor from a panel of six recommended by the College Principal

1. Chairperson, BOS, Dept. of Chemistry, Osmania University, Hyderabad.

IV. Two experts on the subject from outside the college to be nominated by the Academic Council.

1. Prof. P. Saritha Reddy, BOS Chair person, Department of Chemistry, Osmania University, Hyderabad.

2. Prof. P. Leelavathi, Member of BOS, Department of Chemistry, Osmania University, Hyderabad.

3. Dr. Kiranmai, Head, Department Of Chemistry Department, Andhra Mahila Sabha Arts & Science College, Hyderabad.

5. One postgraduate meritorious alumnus to be nominated by the Principal. The Chairman, Board of Studies, may with the approval of the Principal of the College.

1. Shri Vipin Kumar, M.Sc. Chemistry.

2. Shri Vikesh Kumar loan providing officer in SBI Head Office of Mumbai.

(a) Experts from outside the College whenever special courses of studies are to be formulated. - To be nominated

(b) Other members of staff of the same faculty.

HINDI MAHAVIDYALAYA, NALLAKUNTA, HYDERABAD
(AUTONOMOUS)
DEPARTMENT OF CHEMISTRY
AGENDA OF THE MEETING

4.1 Welcome address by the chair.

4.2 Previous Meeting Details.

4.3 Details of choice based credit system.

4.4 Discussion and Distribution of Common Core Syllabus for all the Semesters (V and VI)

4.5 Marks allotted for internal and end semester exams.

4.6 Discussion on Pattern and model paper of Semester Exam and internal exam for all the Semesters (V and VI)

4.7 Discussion on Practical exam model paper for all the Semesters (V and VI)

4.8 Panel of Examiners

4.9 Any other matter

4.10 Vote of thanks

- PAPER V:

  UNIT-III: Solvent extraction method- application in day to day life.

  Paper chromatography: Separation of mixture- separation of D-glucose and D-fructose.

  UNIT-4: Gas chromatography-types of detectors used.

  HPLC- Types of detectors used, types of HPLC, Difference between normal and reverse phase HPLC.

- Laboratory Course :

  Conductometery Experiments - Strong acid vs Strong base.

  Weak acid vs Strong base

  Mixture of acids vs Strong base.

  Potentiometry Experiments: Strong acid vs Strong base.

  Weak acid vs Strong base

  Mixture of acids vs Strong base.

  Two spectral problems by NMR, IR, UV, Mass spectrometry.

- PAPER-VI: Medicinal Chemistry

  UNIT III : Chloromycetin-Synthesis and its therapeutic activity.

iv. Syllabus was approved by the Members of BOS.

4.5 Marks allotted for Internal and end Semester exams.

1. Internal assessment is of 30 marks and this is online / offline test, where students have to answer 20 MCQs in 25 minutes. Each question carries 1 mark. In each Semester two internal assessments of 20 Marks will be conducted and an average of both the internal assessments will be added in the marks of theory exam.

2. Theory Question paper is of 70 marks.

3. Total allotted marks are 100 for each theory paper DSC/DSE (A&B).

The distribution of marks was approved by the Members of BOS.

4.6 Discussion on Pattern and Model Paper of Semester exam and Model Paper of Internal Exam

1. It was informed by the department that in each Semester Two Internal exams will be conducted for 20 marks. The internal assessment will have three sections.

Section – A 20 Multiple choice questions each carries 1marks (20 X 1 =20M),

Section – B Assignment – 5 Marks

Section – C Seminar – 5 Marks

Average marks of these two internal exams will be taken.

2. Semester exam will be conducted as per the Almanac which will be provided by the exam branch. Internal exam duration will be 25 Min and Semester exam duration will be of 2 1/2hrs.

3. Model Question paper for Semester V and Semester VI was discussed. Theory paper for each Semester will have 2 sections.

i) Section A contains 8 short Questions. The student has to answer six questions. Each Question carries 3 Marks (6 X 3=18 Marks)

ii) Section B contains 4 Essay type Questions with internal choice. Each Question carries 13 Marks (4 X 13=52 Marks)

4. Model Question paper of GE for Semester V and Semester VI was discussed. Theory paper for each GE will have 2 sections.

i) Section A contains 8 short Questions. The student has to answer 6 questions. Each Question carries 3 Marks (6 X 3=18 Marks)

ii) Section B contains 4 Essay type Questions with internal choice. Each Question carries 13 Marks (4X13=52 Marks)

- Pattern of Model Theory Question Papers for DSE and GE Paper V are enclosed.

Pattern of Model Theory Question Papers for DSE and GE was approved by Member of BOS

4.7 Discussion on Practical Exam Model paper.

It was decided in BOS meeting that 25 Marks Practical Exam of 3 hrs will be held in each Semester and 1 credit will be given for Practical in each Semester.

- It is decided that the practical examinations held for B.Sc third years (Semester V & VI) from the academic year 2022-23 onwards will have the pattern of 25 marks scheme and the credits will remain the same i.e. 1 credit. The duration of the exam will be 3 hours.

- Pattern of Model Practical Question Papers for Paper V and Paper VI are enclosed.

- Pattern of Model Practical Question Papers was approved by Members of BOS

4.8 Panel of Examiners

The panel of examiners was approved by the members.

List is enclosed

4.9 Any other matter.

4.10 Vote of Thanks

Meeting concluded with the Vote of Thanks by Ms. Anisha Dimple.

Chairperson

Department of Chemistry
Hindi Mahavidyalaya
(AUTONOMOUS & NAAC REACCREDITED)
Nallakunta, Hyderabad-44.

University Nominee

Head
Department of Chemistry
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Members

Principal

PRINCIPAL
HINDI MAHAVIDYALAYA
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1.

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Professor
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CBCS STRUCTURE FOR 2022-2023 BATCH

B.Sc-BIOTECHNOLOGY/BIOCHEMISTRY, MICROBIOLOGY, CHEMISTRY - **ACADEMIC YEAR 2022-2023**

THIRD YEAR SEMESTER - V					Semester End Exam		Continuous Internal Evaluation		Total	Practical 3 hours
Code	Course Title	Course Type	HPW	Credits	Duration in Hours	Marks	Exam Duration	Marks		
BS501	Chemistry of cosmetics, food processing, drugs and pharmaceuticals	GE	4	4	2 1/2	70	30 min.	30	100	
BS502	English	CC-1E	3	3	2 1/2	70	30 min.	30	100	
BS503	Second Language	CC-2E	3	3	2 1/2	70	30 min.	30	100	
BS504	Biotechnology/Biochemistry	DSE-1E	4T+3P =7	4+1=5	2 1/2	70	30 min	30	100	25
BS505	Microbiology V	DSE-2E	4T+3P =7	4+1=5	2 1/2	70	30 min	30	100	25
BS506	Chemistry-V Spectroscopy and Chromatography (OR) Metallurgy, Dyes & Catalysis	DSE-3E	4T+3P =7	4+1=5	2 1/2	70	30 min	30	100	
	Laboratory course- V Experiment in Physical chemistry									25

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CBCS STRUCTURE FOR 2022-2023 BATCH

B.Sc-BIOTECHNOLOGY/BIOCHEMISTRY, MICROBIOLOGY, CHEMISTRY - ACADEMIC YEAR 2022-2023

THIRD YEAR SEMESTER - VI					Semester End Exam		Continuous Internal Evaluation		Total	Practical 3 hours
Code	Course Title	Course Type	HPW	Credits	Duration in Hours	Marks	Exam Duration	Marks		
BS601	**Project/Advanced Chemistry**	**CC-1F**	**4**	**4**	**2 1/2**	**70**	**30 min.**	**30**	**100**	
BS602	English	CC-2F	3	3	2 1/2	70	30 min.	30	100	
BS603	Second Language	CC-3F	3	3	2 1/2	70	30 min.	30	100	
BS604	Biotechnology/Biochemistry	DSE-1F	4T+3P =7	4+1=5	2 1/2	70	30 min	30	100	25
BS605	Microbiology VI	DSE-2F	4T+3P =7	4+1=5	2 1/2	70	30 min	30	100	25
BS606	**Chemistry-VI Medicinal Chemistry (or) Agriculture & Fuel Chemistry**	**DSE-3F**	**4T+3P =7**	**4+1=5**	**2 1/2**	**70**	**30 min**	**30**	**100**	
	Laboratory course-VI Experiment in Physical chemistry									25

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(AUTONOMOUS)
DEPARTMENT OF CHEMISTRY

Semester V
General Elective

Chemistry of Cosmetics, Food Processing, Drugs and Pharmaceuticals

Unit-I: Chemistry of Cosmetics and Perfumes **15 Hrs**

A general study including preparation and uses of the following Hair dye, hair spray, shampoo, sunscreen lotions, lipsticks, talcum powder, nail enamel, creams (cold, vanishing and shaving creams), antiperspirants and artificial flavours. Essential oils and their importance in cosmetic industries with reference to eugenol, geraniol, sandalwood oil, eucalyptus 2-phenyl ethyl alcohol Demonstration experiments or illustration of experimental procedures through charts for the preparation of talcum powder, shampoo and vanishing cream Analysis of deodorants and antiperspirant-Aluminium, Zinc, Boric acid, Chloride and Sulphide.

Unit-II: Food Processing and Food Adulteration

Food processing Introduction, methods for food processing, additives and preservatives Food: processing impact on nutrition, analysis of calcium in milk by complexometric titration. spectrophotometric analysis of iron in foods, Spectrophotometric identification and determination of caffeine and benzoic acid in soft drinks Field Wark Visit to Food Industries. Food adulteration Adulterants in some common food items and their identification: Pulses, chilli powder, turmeric powder. milk, honey, spices, food grains and wheat flour, coffee powder, tea leaves, vegetable oil ghee, ice cream, tomato sauce Field Work-Collection of adulterated food samples, demonstration of a minimum of five experiments for testing adulterants in food items.

Unit-III: General Characteristics of Drug **15Hrs**

Introduction: Diseases - causes of diseases, Drug - definition and sources. ADME of drugs (brief) - Absorption, distribution, drug metabolism (in liver), elimination (brief). Toxicity.

Examples (i) Zin tac (Ranitidine, antacid) (ii) Paracetamol (antipyretic) (iii) Benadryl (Cough syrup). Characteristics of an ideal drug.

Nomenclature of Drugs: chemical name - generic name - trade name. Trade names for the given generic names (i) Aspirin (ii) Amoxycillin (iii) Ciprofloxacin (iv) Paracetamol (v) Mebendazole

Drug formulations: Definition need for conversion of drug into pharmaceutical (drug formulations) - Additives - diluents, binders, lubricants, antioxidants, flavourants, sweeteners, colourants, coating agents. Classification of Drug formulations: oral, parenterals and topical dosage forms - advantages and disadvantages.

(i) Oral Dosage forms: Tablets (Aspirin - analgesic; Ciprofloxacin - antibacterial). Capsules (Amoxycillin - antibiotic; Omeprazole-antacid). Syrups (B-complex syrup; Benadryl- Cough syrup).

(ii) Parenterals (Injection forms): Propranolol (antihypertensive), Heparin (anticoagulant)

(iii) Topical dosage forms: Creams and Ointments

(iv) Antiallergic: Aclometasone (Aclovate), Betamethasone valerate (2%) Multiple purposes, Ketoconazole, (Nizoral Cream), Fluconazole, Anesthetic- Lidocaine, (Lidocaine ointment) and Antiseptic: Boro Plus Cream, For burns -Iodine ointment

(v) Anti-itching: Doxepin Zonalon), Antifungal: Miconozole (Dactarin, Neomicol),

Unit - IV: Classification of Drugs **15Hrs**

Classification of drugs based on therapeutic action-Chemotherapeutic agents, Pharmacodynamic agents and drugs acting on metabolic processes.

Brief explanation for the following:

(i) Chemotherapeutic agents: Antimalarials Antitubercular drugs - Isoniazide; Antiprotozoals - metronidazole.

(ii) Pharmacodynamic agents (a) Drugs acting on CNS: Diazepam (CNS depressant), General anesthetic (thiopental sodium), antipyretic and analgesic (Ibuprofen)

(b) Drugs acting on PNS: local anaesthetics (Benzocaine)

(c) Drugs acting on cardiovascular system: Metoprolol (antihypertensive agents), Nifedipine antianginal and antihypertensive agent)

(d) Drugs acting on renal system: Diuretics (Acetazolamide)

(iii) Drugs acting on metabolic processes (a) Vitamins: Common name, source, deficiency, vitamin A, B2, B6, C, D, E and K – remedy

(b) Hormones: Function (brief) - deficiency of hormones (Insulin, Testosterone and Osterone)

Recommended Text Books and Reference Books

1. Industrial Chemistry, Vol -I, E. Stocchi, Ellis Horwood Ltd, UK.
2. Engineering Chemistry, P.C. Jain, M. Jain, Dhanpat Rai & Sons, Delhi.
3. Industrial Chemistry, Sharma, B.K. & Gaur, H., Goel Publishing House, Meerut (1996).
4. Food Processing and Impact on Nutrition, Kamesh Devi, Sc J Agric Vet Sci., Aug-Sep 2015,2(4):304-311.
5. Perfumes, Cosmetics and Soaps, W.A. Poucher, (1993).
6. A first course in food analysis by A Y Sathe
7. Food Science by N Potter, CBS publishers
8. Food chemistry, Lillian Hoagland Meyer, (2008)
9. A Handbook of food packaging by F. A. Paine and H.Y. Paine.
10. Fundamental concepts of applied chemistry J.C. Ghosh, S. Chand and Co, Ltd, New Delhi.
11. Applied Chemistry I, Bhagavathi Sundari, MJP publishers. K.L.N.Reddy,
12. Drugs by G.L.David Krupadanam, D.Vijaya Prasad, K.Varaprasad Rao, C.Sudhakar, Universities Press (India) Limited 2007.
13. An introduction to Medicinal Chemistry by Graham L. Patrick, Oxford University Press, New York, 1995

HINDI MAHAVIDYALAYA, NALLAKUNTA, HYDERABAD
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DEPARTMENT OF CHEMISTRY
Semester – V

GE Theory Model Question Paper

Time: 2 1/2 hrs

Max.Marks:70

SECTION A **6 X 3 = 18 Marks**

I Write short notes on any three of the following:

1. question from Unit I
2. question from Unit I
3. question from Unit II
4. question from Unit II
5. question from Unit III
6. question from Unit III
7. question from Unit IV
8. question from Unit IV

SECTION B **4 X 13 = 52 Marks**

II Answer two of the following Questions.

9 (a) question from Unit I

(OR)

(b) question from Unit I

10. (a) question from Unit II

(OR)

(b) question from Unit II

11.(a) question from Unit III

(OR)

(b) question from Unit III

12.(a) question from Unit IV

(OR)

(b) question from Unit IV

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DEPARTMENT OF CHEMISTRY

Chemistry Paper V

Spectroscopy and Chromatography

Unit-I: Molecular spectroscopy **15hr (1hr/week)**

S5-E-A-1: Introduction to electromagnetic radiation, interaction of electromagnetic radiation with molecules, various types of molecular spectra.

Rotational spectroscopy (Microwave spectroscopy)

Rotational axis, moment of inertia, classification of molecules (based on moment of inertia), rotational energies, selection rules (no derivatives), Determination of bond length of rigid diatomic molecules, example: HCl.

Infrared spectroscopy

Energy levels of simple harmonic oscillators, molecular vibration spectra, selection rules, detection , determination of force constant(problems), qualitative relation of force constant to bond energies, anharmonic motion of real molecule and energy levels, modes of vibrations in polyatomic molecules, characteristic absorption bands of various functional groups. Finger print nature of infrared spectrum.

Electronic spectroscopy

Bonding and antibonding molecular orbitals, electronic energy levels of molecule (σ, π, η), types of electronic transitions: $\sigma - \sigma * \pi - \pi * \eta - \sigma * \eta - \pi *$ with suitable examples. selection rules, woodfischers rules for conjugated diene, terminology of chromophore, auxochrome, bathochromic and hypsochromic shifts, absorption of characteristic of chromophores: dienes, enone and aromatic chromophores, representation of UV visible spectra. general features of absorption- spectroscopy, transmittance, absorbance and molar absorptivity, Beer lamberts law and its limitations.

Unit-II NMR and Mass spectrometry

S5-A-II: Proton Magnetic Resonance Spectroscopy

Principles of nuclear magnetic resonance, equivalent and non-equivalent protons, position of signals, chemical shift, factors affecting chemical shifts, NMR splitting of signals- spin-spin coupling, representation of proton NMR spectrum-integration. H-NMR spectrum of-ethyl bromide, acetaldehyde , 1,1,2- tribromo ethane, ethyl acetate and acetophenone.

Mass spectrometry

Electron impact mass: Basic principles, nitrogen rule, types of ions: molecular and fragment ions. representation of mass spectrum, types of peaks (molecular ion peak, base peak and isotopic ion peak). determination of molecular formula. mass spectrum of ethyl chloride, ethyl bromide and acetophenone.

UNIT-III: Separation techniques-I

S-E-A-III: Solvent Extraction- Principle, method of extraction: batch extraction, continuous extraction and counter current extraction. Application – determination of Iron (III), its application in day to day life.

Chromatography: Classification of chromatographic methods, principle of differential migration, adsorption phenomenon, nature of adsorbents, solvent system.

Thin layer chromatography (TLC): Advantages, preparation of plates, solid and mobile phase used in TLC, eluotropic series, development of the chromatogram, detection of the spots, locating agents, factors effecting Rf values and application of TLC.

Paper Chromatography: Principle, choice of paper and solvent systems, development of chromatogram- ascending, descending, radial, and two dimensional chromatography, detection of spots and applications of paper chromatography, separation of mixtures separation monosaccharide

Unit IV: Separation techniques-II

S5-E-A-IV: Column Chromatography- Principle, types of stationary phases, column packing -wet packing technique, dry packing technique. selection criteria of mobile phase solvents for eluting polar and non-polar compounds, applications.

Ion exchange chromatography: Principle, cation and anion exchange resins, its application in separation of ions, de-ionized water.

Gas Chromatography: Principle, theory and instrumentation (Block Diagram), types of stationary phases and carrier gases (mobile phase), applications of GC., Types of Detectors used.

High performance liquid chromatography: Principle, theory and instrumentation, stationary phases and mobile phases, types of HPLC, difference between normal and reverse phase HPLC, types of detectors, applications of HPLC, Analysis of paracetamol.

Recommended Text Books and Reference Books

1. Fundamentals of Molecular Spectroscopy, Banwell & McCash
2. Organic spectroscopy, William Kemp, Palgrave Macmillan; 2nd Revised edition 3. Spectroscopy, B K Sharma Krishna Prakashan Media, 1981
4. Elements of Organic Spectroscopy, Y R Sharma.
5. Applications of Absorption Spectroscopy of Organic Compounds (English, Paperback, Dyer R. John)
6.Organic Chemistry, Morrison and Boyd, Pearson Publications.
7.Introduction to Spectroscopy by Donald Pavia, Gary Lampman and George Kriz. Saunders College Division,2001
8. Chemistry text book for B.Sc., published by Telugu Academy, Govt. of Telangana.
9. Analytical Chemistry by David Krupadanam, Universities Press (India) Limited. 10. Principles of Instrumental Analysis, D.A. Skoog, F.J. Holler, T.A. Nieman, Engage earning India Ed.
11. Fundamentals of Analytical Chemistry 6 th Ed., D. A. Skoog, D.M. West, F.J. Holler, Saunders College Publishing, Fort worth (1992).
12. Instrumental Methods of Analysis. 7th Ed. Willard, H.H., Merritt, L.L., Dean, J. & Settle, F.A. Wordsworth Publishing Co. Ltd., Belmont, California, USA, 1988.
13. A Textbook of Quantitative Inorganic Analysis 7th Ed., Vogel, A. I. Prentice Hall.
14. Analytical Chemistry 7 th edition by Gary D. Christian (2004).
15. Separation Methods, M.N Sastry, Himalaya Publication (2004).

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DEPARTMENT OF CHEMISTRY
METALLURGY,DYES AND CATALYSIS 60Hrs

Unit 1: General Principles of Metallurgy and Production of Non Ferrous Metals
S5-E-B-1: Pyrometallurgy: Drying and calcination, roasting, smelting, products of smelting. **Hydrometallurgy**: Leaching methods, leaching agents, leaching of metals, oxides and sulphides. **Separation of liquid and solid phases and processing of aqueous solutions** Electrometallurgy Electrolysis. Refining electrolysis, electrolysis from aqueous solutions, fused-salt electrolysis **Refining processes**: Chemical and physical refining processes **Production of selected non-ferrous metals (Copper, Nickel, Zine):** Properties, raw materials, production (flow charts and chemical reactions involved) and uses.

15Hrs

Unit II: Natural and Synthetic Dyes
S5-E-B-II: Dyes: Classification of dyes- Natural dyes, synthetic dyes; based on chemical constitution of dyes: Chemical nature of dyes: Applications of dyes. **Stuctures of natural dyes**: Indigo. Tyrian purple, Alizarin, Indigotin **Structures of Synthetic Dyes**: Nitrodyes, Nitrosodyes, Azodyes (Mono azodyes, bisazodyes), diaryl methane dyes, triaryl methane dyes, Xanthene dyes, Phenolphthalein, Fluorocein, Acridine dyes. **Synthesis of dyes**: Mono azodyes, bisazodyes (Congo red), Auromine O, Malachite Green, Crystal Violet, Rhodamine B. Acridine Yellow, Indigotin. Binding of dyes to fabric. Applications of dyes.

15Hrs

Unit III: Catalysis I
S5-E-B-III: Homogeneous and heterogeneous catalysis
Definition of a catalyst and catalysis. Comparison of homogeneous and heterogeneous catalysis with specific examples. General characteristics of catalytic reactions. **Acid-base catalysis-** Examples of acid and base catalysed reactions, hydrolysis of esters. Kinetics of acid catalysed reactions. Specific acid and general acid catalysis, Kinetics of base catalysed reactions. Specific base and general base catalysis. Examples-Aldol condensation and decomposition of nitramide, base catalysed conversion of acetone to di acetone alcohol. Mutarotation of glucose. Effect of pH on reaction rate of acid and base catalysed reactions. **Phase transfer catalysis**: Principle of phase transfer catalysis, classification of phase transfer .Factors influencing the rate of PTC reactions.

15Hrs

Unit IV: Catalysis II
S5-E-B-IV:Enzyme catalysis:
catalysis- Characteristics of enzyme catalysis, Examples: (i) Invertase in inversion of cane sugar (ii) Maltase in conversion of maltose to glucose (iii) Urease in decomposition of urea (iv) Zymase in conversion of glucose to ethanol (v) working of carbonic anhydrase and (vi) Mechanism of oxidation of ethanol by alcohol dehydrogenase Factors affecting enzyme catalysis. Effect of temperature, pH, concentration and effect of inhibitor on enzyme catalysed reactions. Catalytic efficiency Kinetics of enzyme catalysed reactions Michaelis-Meriton Equation Mechanism of enzyme catalysed reactions Significance of Michaelis constant (Km) and maximum velocity (Vmax), Lineweaver-Burk plot. Types of enzyme inhibitors

Recommended Text Books and Reference Books

1. Industrial Chemistry, BK Sharma
2. Engineering Chemistry, Jain and Jain
3. Industrial Chemistry E. Stocchi, Vol-1, Ellis Horwood Ltd. UK
4. Handbook of Industrial Chemistry, J. A. Kent. Riegel's, CBS Publishers, New Delhi.
5. Theory of production of non- ferrous metals and alloys Study. Katefina Skotnicová, Monika Losertová, Miroslav Kursa
6. The Chemistry of Synthetic Dyes, Volume 4, K Venkataraman Elsevier
7. Organic Chemistry Vol-I by IL. Finar.
8. Organic Chemistry by Jennice, Gorzinski Smith
9. Natural Dyes: Sources, Chemistry, Application and Sustainability Issues by Sujata Saxena and A. S. M. Raja.
10. Physical Chemistry by Atkins and De Paula, 8 th Edn.
11. Physical Chemistry by Puri, Sharma and Pattania, 2017.
12. Kinetics and mechanism of chemical transformations by Rajarajm and Kuraiacose. Published by Macmillan India Ltd.
13. Text book of Physical Chemistry, K.L.. Kapoor, Macmillan, 1999.
14. Catalysis, J.C. Kuriacose, Macmillan Macmillan Publishers India Limited, 1980.
15. Phase Transfer Catalysis, Fundamentals, Applications and Industrial perspective, C. M. Stark, C. Liotta & M. Halpern, Academic Press
16. Phase Transfer Catalysis, E. V. Dehmlow & S. S. Dehmlow, Verlag Chemie, Weinheim

HINDI MAHAVIDYALAYA, NALLAKUNTA, HYDERABAD
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DEPARTMENT OF CHEMISTRY

Chemistry Paper- V (PHYSICAL CHEMISTRY)

Laboratory courses **45 h (3h/w)**

1. **Distribution law**
a) Determination of molecular status and partition coefficient of benzoic acid in toluene and water.
b) Determination of distribution coefficient of acetic acid between n-butanol and water.

2. **Conductometry**
a) Determination of cell constant of a conductivity cell.
b) Conductometric titration of strong avid vs strong base.
c) Conductometric titration of weak acid vs strong base.
d) Conductometric titration of mixture of acids vs strong base.

3 .**Potentiometry**
a) Potentiometric titration of Strong avid vs strong base.
b) Potentiometric titration of weak acid vs strong base.
c) Potentiometric titration of mixture of acids vs strong base.

4.. **Colorimetry**
a) Verification of Beer's law using KMnO4 and CuSo4.

b) Determination of the concentration of the given KMnO4 and CuSo4 solution.

5. **Physical constants**

a) Surface tension and b) viscosity of liquids. (Demonstration Experiment)

6..**Spectral problem:** Study of 2 spectra by NMR, UV, IR and Mass spectroscopy.

Reference books:

1. Senior practical physical chemistry. B. D. Khosla, V.C. Garg, Adarsh Gulati Published by R. Chand & Co.
2. Practical Physical Chemistry: B. Vishwanathan and P.S. Raghavan. Viva Books
3. Practicals in Physical Chemistry by P.S. Sindhu ISBN-10: 1-4039-2916-5/1403929165 ISBN-13: 978-1-4039-2916

HINDI MAHAVIDYALAYA, NALLAKUNTA, HYDERABAD
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DEPARTMENT OF CHEMISTRY
Semester – V Paper – V
Theory Model Question Paper

Time: 2 1/2 hrs Max.Marks:70

SECTION A

I Write short notes on any Six of the following: **6 X 3 = 18 Marks**

1. Question from Unit I
2. Question from Unit I
3. Question from Unit II
4. Question from Unit II
5. Question from Unit III
6. Question from Unit III
7. Question from Unit IV
8. Question from Unit IV

SECTION B

II Answer all the Questions. Each question carries 13 marks **4 X 13 = 52 Marks**

9. (a) Question from Unit I
   (b) Question from Unit I
   (OR)
   (c) Question from Unit I
   (d) Question from Unit I
10. (a) Question from Unit II
    (b) Question from Unit II
    (OR)
    (c) Question from Unit II
    (d) Question from Unit II
11. (a) Question from Unit III
    (b) Question from Unit III
    (OR)
    (c) Question from Unit III
    (d) Question from Unit III
12. (a) Question from Unit IV
    (b) Question from Unit IV
    (OR)
    (c) Question from Unit IV
    (d) Question from Unit IV

Chairperson University Nominee Members

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Head
Department of Chemistry
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Hyderabad-007

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HINDI MAHAVIDYALAYA, NALLAKUNTA, HYDERABAD
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DEPARTMENT OF CHEMISTRY

Semester – V Paper - V

Practical Model Question Paper

Time 3 hrs **Max. Marks:25**

1.Write the Principle of the given Experiment. (5 Marks)

2.Carryout the given allotted experiment. (15 Marks)

3. Record (2 Marks)

4. Viva (3 Marks)

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DEPARTMENT OF CHEMISTRY

Semester – VI Paper V

Advanced Chemistry

60 Hrs

15 Hrs

Unit-1 (Inorganic Chemistry)

S6-0-1-1: Inorganic reaction mechanisms

Labile and inert complexes, thermodynamic and kinetic stability based on VBT & CFT: ligand substitution reactions -Sn1 and Sn2 in Octahedral complexes: substitution reactions of square planar complexes- Trans effect and applications of trans effect, reactions of tetrahedral complexes-hydrolysis of silicon halides and phosphorous oxides

S6-0-1-2: Boranes and Carboranes

Definition of clusters. Structures of boranes and carboranes- wade's rules, closo, nido, arachno boranes and carborane

S6-0-1-3: Symmetry of molecules

Symmetry operations and symmetry elements in molecules, definition of axis of symmetry types of c. plane of symmetry, center of symmetry and improper rotational axis of symmetry(S), explanation with examples.

S6-O-1-4: Non-aqueous solvents

Classification and characteristics of a solvent, reactions in liquid ammonia-physical properties, auto-ionisation, examples of ammino acids and ammino bases, reactions in liquid ammonia precipitation, neutralization, solvolysis, solvation solutions of metals in ammonia, complex formation, redox reactions, reactions in HF-auto ionization, reactions in HF- precipitation, acid-base reactions, protonation.

15Hrs

Unit-II (Organic Chemistry)

S6-0-0-1: Pericyclic Reactions

Concerted reactions, molecular orbitals of ethene, 13-butadiene and allyl radical, symmetry properties, HOMO, LUMO, thermal and photochemical pericyclic reactions, types of pericyclic reactions-electrocyclic, cycloaddition and sigma tropic reactions- one example each and their explanation by FMO theory.

S6-0-0-2: Synthetic Strategies

Terminology target molecule (TM), disconnection approach retrosynthesis, synthon, synthetic equivalent (SE). functional group interconversion (FGI), linear, convergent synthesis. Retrosynthetic analysis of the following molecules: 1) acetophenone 2) cyclohexene 3) 2-phenylethanol.

S6-O-O-3: Asymmetric synthesis

Definition and classification of stereoselective reactions: substrate, product stereoselective reactions, enantio and diastereo selective reactions, stereospecific reaction-definition-example - dehalogenation of 1,2-dibromides induced by iodide ion, enanto selective reactions - definition - example-reduction of Ethyl acetoacetate by yeast, diastereoselective reaction- definition, examples: Acid catalysed dehydration of 1-phenylpropanol and Grignard addition to 2-phenyl propanal, definition and explanation of enantiomeric excess and diastereomeric excess.

15 Hrs

Unit III (Physical Chemistry)

S6-O-P--1: Polymers

Definition of polymers - natural polymers and synthetic polymers examples, classification as plastics, fibers, elastomers.

Thermosetting, thermoplastic polymers, branched, cross-linked and co-polymers, explanation: chain polymerization, step polymerization, co-polymerization and co-ordination polymerization, kinetics of free radical polymerization, tacticity, atacticity, stereo specific synthesis-Zeigler-Natta catalyst.

Molecular weight definitions- number average, weight average molecular weight, determination of molecular weight of polymers using viscosity method, osmometric method, problems.

Preparation and industrial applications of polyethylene, poly vinyl chloride (PVC), nylon -66, teflon, polyacrylonitrile and terelene.

15 Hrs

Unit IV: (General Chemistry)

S6-O-G-1: Electroanalytical methods : Types of Electroanalytical Methods.

I) Interfacial methods a) Potentiometry: Principle, electrochemical cell, electrodes

Reference electrodes - Normal Hydrogen Electrode, quinhydrone electrode, saturated calomel electrode, numerical Problems. application of potentiometry -assay of sulphanilamide

b) Voltametry- three electrode assembly; Introduction to types of voltametric techniques, micro electrodes, over potential and polarization.

II) Bulk methods - Conductometry, conductivity cell, specific conductivity, equivalent conductivity. numerical problems. applications of conductometry. estimation of Cl- using. AgNO3. Determination of Aspirin with KOH

Recommended Text Books and Reference books

1. Basic Inorganic Chemistry by F.A.Cotton, G. Wilkinson and Paul.L. Gaus 3 rd edn WileyPublishers (2001). 2. Inorganic Chemistry Principles of structure and reactivity by James E.Huhey, E.A. Keiter and R.L. Keiter 4 th edn. (2006)

3. Inorganic Chemistry by Shriver and Atkins 3 rd edn Oxford Press (1999).

4. Principles of Inorganic Chemistry by Puri, Sharma and Kalia Vishal Publications (1996).

5. Symmetry and Spectroscopy of Molecules, K. Veera Reddy, Second Edition, New Age International (P) Limited Publishers

6. Textbook of Inorganic Chemistry by R. Gopalan, Universities Press,(2012)

7. Text book of organic chemistry by Morrison and Boyd, Pearson Publishers (2009) 8. Text book of organic chemistry by Graham Solomons, Wiley(2015)

8.Textbook of organic chemistry by Graham Solomons, Wiley(2015).

9. Fundamentals of organic synthesis and retrosynthetic analysis by Ratna Kumar Kar, 10. Organic synthesis by Dr. Jagadamba Singh and Dr. L.D.S. Yadav, Pragati Prakashan, NCBA,(2014) 2010
11. Stereochemistry of organic compounds by D. Nasipuri, New Academic Science Limited, 2012
12. Organic chemistry by Clayden, Greeves, Warren and Wothers, Oxford University Press,2001
13. Fundamentals of Asymmetric Synthesis by G. L. David Krupadanam, Universities Press(2014)
14. Polymer Chemistry, M G Arora and M Singh
15. Introductory Polymer Chemistry by GS Misra
16. Textbook of Polymer Science, F. W. Billmeyer Jr, John Wiley & sons
17. Polymer Science, V. R. Gowarikar, N. V. Viswanathan & J. Sreedhar, Wiley Eastern
18. Contemporary Polymer Chemistry, H. R. Alcock & F. W. Lambe, Prentice Hall
19. Materials Science and Engineering An Introduction by William D. Callister, Jr. John Wiley & Sons, Inc.
20. Principles of Instrumental Analysis, D.A. Skoog, F.J. Holler, T.A. Nieman, Engage earning India Ed.

HINDI MAHAVIDYALAYA, NALLAKUNTA, HYDERABAD
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DEPARTMENT OF CHEMISTRY

Semester – VI Paper VI

(MEDICINAL CHEMISTRY) 60 Hrs

Unit- I: Introduction and Terminology 15 hrs

S6-E-A-1: Diseases: Common diseases, infective diseases-insect borne, air-borne, water-borne and hereditary diseases.
Terminology in Medicinal Chemistry: Drug, active pharmaceutical ingredient (API), pharmaceuticals, pharmacology, pharmacophore, pharmacodynamics, pharmacokinetics, metabolites, antimetabolites and therapeutic index.
Drugs: Nomenclature: Chemical name, generic name and trade names with examples,classification: classification based on structures and therapeutic activity with examples. formulation.
ADMET: a) Absorption: definition, absorption of drugs across the membrane - active and passive absorption, routes of administration of drugs. b)distribution: definition and effect of plasma protein binding c) metabolism: definition, phase I and phase II reactions. d) elimination: definition and renal elimination. toxicity.

Unit-II: Enzymes and Receptors 15Hrs

S6-E-A-II: Enzymes: Introduction, mechanism and factors affecting enzyme action, specificity of enzyme action (including stereo specificity), enzyme inhibitors and their importance, types of inhibition-reversible, irreversible and their subtypes with examples.
Receptors: Introduction, drug action-receptor theory, mechanism of drug action, concept of agonists and antagonists with examples. drug receptor interactions involved in drug receptor complex, binding role of -OH group. -NH, group, quaternary ammonium salts and double bond. structure-activity relationships of drug molecules, explanation with sulfonamides.

Unit III: Synthesis and Therapeutic Activity of Drugs 15Hrs

S6-E-A-III: Introduction, synthesis and therapeutic activity of Chemotherapeutics: Sulphanilamide, dapsone, Pencillin -G (semi synthesis),chloroquine,
Isoniazid, Cisplatin and AZT. Chloromycetin(antibiotic)
Drugs to treat metabolic disorders: Anti diabetic-Tolbutamide, Anti inflammatory- Ibuprofen, cardiovascular- glyceryl trinitrate, antipyretic (paracetamol, aspirin) and antacid omeprazole.
Drugs acting on nervous system: Anesthetics -definition, classification-local and general. volatile-nitrous oxide, chloroform uses and disadvantages. Local anaesthetics-benzocaine.

Unit- IV: Molecular Messengers, Vitamins and Micronutrients 15Hrs

S6-E-A-IV: Molecular Messengers: Introduction to hormones and neurotransmitters, thyroid hormones, antithyroid drug- carbimazol, adrenaline: adrenergic drugs- salbutamol and atenelol. Serotonin: SSRIs-fluoxetine. Dopamine: Anti parkinson drug- Levodopa.
Vitamins and Micronutrients: Introduction, vitamin sources, Deficiency disorders and remedy of Vitamins A, B, C, D, E, K and micronutrients Na, K, Ca, Cu, Zn and I.

Recommended Text Books and Reference books

1. Introduction to Medicinal Chemistry, G... Patrick, Oxford University Press, New York 2013. Computer generated

2 Medicinal Chemistry. Thomas Nigrady, Oxford Univ. Press, New York 2005,

3. Foye's Principles of Medicinal Chemistry, David William and Thomas Lemke,Lippincott Williams & Wilkins, 2008.

4. Medicinal Chemistry, Ashutosh Kar. New Age International, 2005. Synthetic Drugs, O.D.Tyagi & M. Yalav. Anmol Publications, 1998.

5.Synthetic Drugs,O.D.Tyagi and M.Yadav, Anmol Publications,1998.

6. Medicinal Chemistry, Alka L. Gupta, Pragati Prakashan,

7. Drugs, G. L. David Krupadanam, D. Vijaya Prasad, K.Varaprasad Rao, K. L. N. Reddy. C. Sudhakar, Universities Press (India) Ltd. 2012

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AGRICULTURE AND FUEL CHEMISTRY 60Hrs

Unit I:-Pesticides 15Hrs

So-E-B-1: Introduction Definition, classification of pesticides based on use(target). Toxicity and chemical structure with examples. Adverse effects of pesticides and its impact on environmental pollution

Synthesis, manufacture and uses of representative pesticides: Organochlorines(Cypermethrin) Organophosphates(Parathion), carbamates(Carbary1),quinones(Chloranil), anilides(Alachlor).

Pesticide formulations: Dusts. Granules, Wettable powders. Emulsions and Aerosols.

Biopesteides: Introduction: Potential pesticidal plants of India. Role of Neem in plant protection-constituents, Azadirachtin and its role in pest control, Structure and mode of action of Pyrethrins(pyrethrin-1) and Pyrethroids (permethrin) and nicotinoids (Imidacloprid)

Unit II:-Fertilizers

S6-E-B-II: Introduction: (need of fertilizers), functions of essential plant nutrients (N, P. K), Classification formula and uses of fertilizers.

Nitrogenous fertilizers: Ammonium nitrate, Urea, Calcium Cyanamide, Calcium Ammonium Nitrate, Sodium Nitrate, Ammonium Chloride and their uses.

Phosphate fertilizers: Normal super phosphate, Triple Super Phosphate, Ammonium Phosphate and their uses.

Potassium fertilizers: Potassium chloride, potassium nitrate, potassium sulphate and uses. Complex fertilizers: Diammonium Phosphate and mixed fertilizers their uses. Manufacture of urea and Super phosphate of lime and their reactions in the soil.

Biofertilizers - Introduction, definition, classification, Rhizobium, Azatobactor, Azospirillium, Azolla, Blue Green Algae. Vermicomposting and uses.

Organic farming: The principal methods, crop rotation, green manures and compost, biological pest control, and mechanical cultivation and uses.

Unit III: Energy Sources and Coal

S6-E-B-III: Review of energy sources (renewable and non-renewable). Classification of fuels and their calorific value.

Coal: Uses of coal (fuel and nonfuel) in various industries, its composition, carbonization of coal. Coal gas, producer gas and water gas composition and uses. Fractionation of coal tar, uses of coal tar based chemicals, requisites of a good metallurgical coke, Coal gasification (Hydro gasification and Catalytic gasification), Coal liquefaction and Solvent Refining

Unit IV: Petroleum and its products, petrochemicals and non petroleum fuels

S6-E-B-IV:

Petroleum and its products

Petroleum: Origin, Composition of crude petroleum and classification. Properties- flash point and its determination, Knocking and antiknocking compounds; Octane number, and Cetane number. Distillation of crude petroleum, Fractional Distillation - Principle and process, refining, Fractions and uses. Cracking-Thermal and catalytic cracking, Reforming.

Petroleum products - Petrol, Diesel, IPG, Kerosene, Tar and applications.

Petrochemicals: Vinyl acetate, Propylene oxide, Isoprene and their uses.

Lubricants: Classification of lubricants- Solid, semisolid and liquids, properties (viscosity, flash point, fire point, cloud point, pour point) and their determination. Functions of lubricants. Mechanism of lubrication.

Non-petroleum fuels: Natural Gas-CNG, LNG, Clean Fuels-H, gas, ethanol, Fuel from waste-bio-gas, Fuel from biomass-bio-ethanol, biodiesel, Synthetic fuels- syngas based.

Recommended Text Books and Reference books

1. Chemistry of pesticides, N. N. Melnikov. Springer-Verlag- Technology & Engineering (2012).
2. Pesticide Synthesis Handbook, Thomas A. Unger, Elsevier, (2000).
3. Pesticides, R. Cremlyn, John Wiley, 1980.
4. Manures and Fertilisers, K. Kolay, Published by Atlantic (2007).
5. Sharma, B.K. & Gaur, H. Industrial Chemistry, Goel Publishing House, Meerut (1996).
6. A Text Book of Engineering Chemistry Paperback-2017 by Shashi Chawla
7. Industrial Chemistry, Vol-1, Stocchi, E, Ellis Horwood Ltd. UK (1990).
8. Jain, P.C. and Jain, M. Engineering Chemistry Dhanpat Rai & Sons, Delhi.
9. Engineering Chemistry by Shashi Chawla, Dhanpat Rai & Sons, Delhi.

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DEPARTMENT OF CHEMISTRY

Semester – VI Paper – VI (Laboratory Course) 45h (3 h/w)

1. Kinetics

a) Determination of specific reaction rate of the hydrolysis of methyl acetate catalyzed by hydrogen ion at room temperature.

b) Determination of rate of decomposition of hydrogen peroxide catalyzed by $FeCl_3$.

c)Determination of rate of saponification of Ethyl acetate

2. A. Potentiometry:

a) Determination of redox potential of Fe^{2+}/Fe^{3+} by potentiometric titration of ferrous ammonium sulphate vs. potassium dichromate.

b) Precipitation titration of KCl vs. $AgNO_3$ -Determination of given concentration of silver nitrate.

B. pH metry:

a) pH metric titration of strong acid (HCI) vs. strong base- Determination of the concentration of the given acid.
b) pH metric titration of weak acid(acetic acid) with strong base(NaOH).- Determination of acid dissociation constant (K,) of weak acid.

3. Conductometry:
a) Determination of overall order: Saponification of ethyl acetate with NaOH by conductance measurements.

Reference books:
1. Senior practical physical chemistry. B. D. Khosla, V.C. Garg, Adarsh Gulati
2. Advanced Practical Physical chemistry: J.B.Yadav 3. Practical Physical Chemistry: B. Vishwanathan and P.S. Raghavan. 4. Practical in Physical Chemistry: P.S. Sindhu

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Semester – VI Paper – VI

Time: 2 1/2 hrs **Theory Model Question Paper** Max.Marks:70

SECTION A

I Write short notes on any Six of the following: ***6 X 3 = 18 Marks***

1. question from Unit I
2. question from Unit I
3. question from Unit II
4. question from Unit II
5. question from Unit III
6. question from Unit III
7. question from Unit IV
8. question from Unit IV

SECTION B

II Answer all the Questions. Each question carries 13 marks ***4 X 13 = 52 Marks***

9 (a) question from Unit I
(b) question from Unit I
(OR)
(c) question from Unit I
(d) question from Unit I

10. (a) question from Unit II
(b) question from Unit II
(OR)
(c) question from Unit II
(d) question from Unit II

11. (a) question from Unit III
(b) question from Unit III
(OR)
(c) question from Unit III
(d) question from Unit III

12.(a) question from Unit IV
(b) question from Unit IV
(OR)
(c) question from Unit IV
(d) question from Unit IV

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DEPARTMENT OF CHEMISTRY

Practical Model Question Paper

Time 3 hrs **Max. Marks:25**

1. Write the Principle of the given experiment. (5 Marks)

2. Carryout the given experiment with minimum ten experimental reading, tabulation, calculation and graph (15 Marks)

3. Record (2 Marks)

4. Viva (3 Marks)

Chairperson

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HINDI MAHAVIDYALAYA, NALLAKUNTA, HYDERABAD
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DEPARTMENT OF CHEMISTRY
PANEL OF EXAMINERS

S.NO	NAME OF THE EXAMINER	MOBILE NUMBER
1.	Dr.Kiranmai Head, Dept.of Chemistry Andhra Mahila Sabha, Arts & Science College,O.U Campus, Hyderabad.	9849641932
2.	Dr.Shanthi Sudha Head, Dept.of Chemistry GDC,Chengicherla College,O.U Campus, Hyderabad.	8801565859
3.	Mr. Ravi Asst.Prof, Dept of Chemistry, University college of womens,koti,Hyderabad.	885017710
4.	Mrs.Swapna Dept.of Chemistry Andhra Mahila Sabha, Arts & Science College,O.U Campus, Hyderabad.	9299406771
5.	Dr.G.Vijayalakshmi Asst. professor, Dept.of Chemistry University collage of women's Koti,Hyd	7893547611
6.	Dr.M.Kavitha Asst. professor, Dept.of Chemistry University collage of women's, Koti Hyd.	9491062918
7.	Dr.Jeevana Jyothi Head,Dept.of Chemistry RBVRR Women's College, Narayanaguda,Hyd.	8121498096
3.	Dr.D.Swapna Head,Dept.of Chemistry, RBVRR Women's College Narayanaguda,Hyd.	8106916444

9.	Dr.Vijaya Jyothi Asst.Professor, Dept.of Chemistry BJR Govt. Degree College,Hyd.	9441780533
10.	Dr.A.Santhoshi Dept.of Chemistry BJR Govt. Degree College,Hyd.	9515876485

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