

Krantiguru Shyamji Krishna Verma

Kachchh University

Mundra Road

BHUJ : 370 001



SYLLABUS

B. Sc. Semester IV : (FOUR)

CHEMISTRY

TWO Papers :

Code No : CECH-405 (Physical Chemistry)

Code No : CECH-406 (Analytical Chemistry)

With effect from June 2016

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KACHCHH UNIVERSITY : BHUJ
SEMESTER : IV (FOUR)

CHEMISTRY PAPER : 5 (wef June 2016)

Paper Code NO. : CECH- 405 (PHYSICAL CHEMISTRY)

UNIT-I : THERMODYNAMICS:

[15]

Carnot cycle, Efficiency of heat engine, Entropy change for an ideal gas, Entropy change at constant pressure and constant volume, Physical Significance of entropy , Clausius –Clapeyron Equation.

UNIT :II

(A) ELECTRO CHEMISTRY:

[7]

Transference Number and its determination by Hittrof's method and Moving Boundary method, Conduct metric Titration , Reversible Cells, Electrodes (Standard Hydrogen , Calomel, Quinhydrone), Nernst equation (derivation), Electrical double charge layer and electrode potential, Nernst equation, Electrodes reversible with respect to cations, Electrodes reversible with respect to anions, Metal insoluble salt electrodes, Oxidation-reduction electrodes, Reference electrodes, Glass electrode.

(B) NUCLEAR CHEMISTRY:

[8]

Detection of Ionizing radiation by G.M. counter, Scintillation counter, Proportional counter, Acceleration of charged particles by Cyclotron, Linear Accelerators and Nuclear Fission.

UNIT : III

(B) CHEMICAL KINETICS:

[07]

Second Order and Third Order Reaction, Activated Complex Theory, Chain Reactions, Consecutive Reactions.

(A) CATALYSIS:

[08]

Criteria and Types of Catalysis, Active Centers, Enzyme catalyzed reactions, Catalytic poisoning, Retardation reaction.

UNIT-IV:

(A) COLLOIDS :

[10]

Colloidal state, Preparation, Purification, Electro optical and Electro kinetic properties of colloids, Gels & Emulsions , Determination of Molecular weight of Polymers by Donnan equilibrium , Osmotic Pressure and Viscosity methods.

(B) ADSORPTION:

[05]

Adsorption and its types, Freundlich adsorption isotherm, Langmuir adsorption isotherm.

REFERENCE BOOKS :

- (1) Principles of Physical Chemistry : B.R Puri, L.R Sharma, M.S Pathania. 41st Edition.
- (2) Elements of Physical Chemistry : Glasstone and Lewis, 3rd Edition , Macmillan & Co.
- (3) Physical Chemistry : Walter Moore , 4th Edition, Orient Longman.
- (4) Physical Chemistry : G.M Barrow, 5th Edition, McGraw-Hill, New York, 1988.
- (5) Physical Chemistry : Daniel & Alberty, 4th Edition
- (6) Physical Chemistry : P.W. Atkins, 5th edition. Oxford University Press, 1984.
- (7) Physical Chemistry : Lavine.
- (8) Thermodynamics : Glasstone.
- (9) Electro chemistry : Glasstone.

PATTERN OF QUESTION PAPER FOR SEMESTER-END EXAMINATION

Total Marks : 60 , Duration : THREE Hours
Passing standard : 40% ie 24 Marks

1. Internal options are compulsory (i.e. Q.1 or Q.1; Q.2 or Q.2 etc. or attempt 2 or 3 out of given four or five)
2. There are four questions (Q. 1 to Q. 4) each carrying 15 marks

The structure for the questions is as under:

Questions	Section	Marks
Question – 1	A (Objective type) (<i>no internal option</i>)	5 marks
Unit – I	B (Descriptive - Essay type - Short notes <i>with internal option</i>)	10 marks
Question – 2	A –do-	5 marks
Unit –II	B –do-	10 marks
Question – 3	A –do-	5 marks
Unit – III	B –do-	10 marks
Question – 4	A –do-	5 marks
Unit – IV	B –do-	10 marks

Types of questions for section A are varied: like: one line answers/ two line answers/ definitions/ reasoning/ derivations of equations/ derivations of sums/ drawing small figures/ matching the figures etc.

KACHCHH UNIVERSITY : BHUJ**SEMESTER : IV (FOUR)****CHEMISTRY PAPER : 6 (wef June 2016)****Paper Code No. : CECH- 406 (ANALYTICAL & INDUSTRIAL CHEMISTRY)****UNIT : I :****(A) INERT GAS COMPOUNDS :** [5]

Hydrates of Noble gases, Clathrates of noble gases, uses of Clathrates, Bartlett's experiment, Fluorides, Oxofluorides, and Oxides of Xenon (preparation, properties & structure).

(B) METAL CARBIDES : [5]

Classification and application.

(C) FERTILIZERS: [5]

Industries in India, manufacture of Ammonical fertilizers, Ammonium salts, Urea, nitrates, phosphate and super phosphates, mixed fertilizers. Micronutrient and their role in fertilizers.

UNIT : II**(A) PHYSICAL PROPERTIES AND MOLECULAR STRUCTURE :** [10]

Molar volume, surface tension and parachor, Viscosity. Molar refraction, optical rotation, polar and non-polar molecules, dielectric constant, dipole moment. Its measurement only by temperature method and its application. Diamagnetism and paramagnetism, Magnetic susceptibility, Magnetic moment and its determination by Gouy method.

(B) GLASS : [5]

Manufacture of Glass , Types of glass.

UNIT : III :**(A) DETECTION and ESTIMATION OF FUNCTIONAL GROUPS :** [8]

-NH₂ (Aniline), -CHO (Glucose), -COOH (Benzoic acid) , Ester (Ethyl acetate) , -CONH₂
(Acetamide) -NO₂ (Nitrobenzene) .

(B) LIPIDS : [7]

Definition, Chemical composition of oils, fats and waxes, Name and structures of few fatty acids found in oil, fat and waxes, Hardening of oil, Drying oil, Soap and Saponification, Detergents : Preparation of ABS and LAS , Mechanism of Cleaning, Bio hard and bio soft detergents, Biological role of Lipids. Acid value, Saponification value and Iodine value of oil.

UNIT : IV

(A) UV – VISIBLE SPECTROSCOPY :**[9]**

Introduction to spectroscopy, Various electronic transitions, Origin of UV-Vis band, Form of spectrum, Chromophore, Auxochrome, Bathochromic shift, Hypsochromic shift, Hyperchromic shift, Hypochromic shift., UV spectra of Alkene and conjugated diene, Solvent effect on UV-Vis spectra of Alkenes, carbonyl compounds, Theoretical calculation of λ_{max} in Ethanol solvent for enes, enones, aromatic carbonyl (benzoyl) compounds applying Woodward-Fischer empirical rules, UV –Vis spectra of Polynuclear hydrocarbons, Application in geometrical isomerism.

(B) PESTICIDES :**[6]**

General, Definition, Classification, Synthesis of DDT, BHC, Aldrin and Malathion

Reference Books :

- (01) Vogel's Quantitative Inorganic analysis : G Svehla , 6th Edition, Orient Longman,
- (02) Analytical chemistry : D.A Skoog, D.M West, F.J Holler, 5th Ed, Saunder's college,Publishers,London,1990.
- (03) Synthetic Organic Chemistry : O P Agarwal.
- (04) Basic course in Organic Chemistry : Ramesh Luhana Rughwani :

Mangalam Puvblication. New Delhi

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KACHCHH UNIVERSITY : BHUJ
SEMESTER : IV (FOUR) (Paper CECH-405 P)

CHEMISTRY PRACTICALS (wef June 2016)

Marks : External Evaluation : 30 , Internal Evaluation : 20 . Total 50

One exercise from each part to be set for examination .

(A) PHYSICAL CHEMISTRY :

[24]

01 Conductometry :

1. Determination of the strength of HCl by titrating it against standard solution of NaOH
2. Determination of strength of HCl and Acetic acid in a given mixture of acids by titrating against 0.1 N NaOH

02 Adsorption :

1. Determination of degree of adsorption of a given organic acid on activated Charcoal.

03 Distribution Law :

1. To study partition co-efficient of Benzoic acid between Water and Benzene
2. To study partition co-efficient of Acetic acid between Water and Chloroform

(B) VIVA :

[3]

Viva will be asked during practical exam and will be strictly based on the practicals.

(C) JOURNAL :

[3]

Journals should be signed periodically and finely Certified.

KACHCHH UNIVERSITY : BHUJ
SEMESTER : IV (FOUR) (Paper CECH-406 P)

CHEMISTRY PRACTICALS (wef June 2016)

Marks : External Evaluation : 30 , Internal Evaluation : 20 . Total 50

One exercise from each part to be set for examination .

(A) VOLUMETRIC ANALYSIS : **[12]**

1. Determination of amount of Zinc ion by EDTA
2. Determination of amount of Ni ion by EDTA method
3. Determination of Nitrite (KNO_2) by Oxidation method using KMnO_4
4. Hardness of water

(B) ORGANIC ESTIMATION : **[12]**

To find out the amount of Aniline, Phenol, Glucose , Amide , Carboxylic acid in the given solution by volumetric analysis

(C) VIVA : **[3]**

Viva will be asked during practical exam and will be strictly based on the practicals.

(D) JOURNAL : **[3]**

Journals should be signed periodically and finely Certified.
