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Kachchh University

Mundra Road

BHUJ : 370 001

SYLLABUS (CBCS)

B. Sc. Semester II : (TWO)

CHEMISTRY

Code No: **CECH-202**

With effect from June 2016

KACHCHH UNIVERSITY: BHUJ
FIRST YEAR B. Sc: CBCS: SEMESTER: II (TWO)
CHEMISTRY PAPER
Paper name: General Chemistry (Core Elective)
Paper Code NO.: CECH-202

Unit-I : PHYSICAL CHEMISTRY : [15 Marks]

(a) The Gaseous state:. (7 Marks)

Deviation from ideal behavior, cause of deviation, Van-der-Waal's equation and its application, method of limiting densities, critical state, Relation between critical constants and Van-der-Waal's constant, Law of corresponding states, Liquefaction of gases, Maxwell's distribution of molecular velocity, Collision number, mean free path.

(b) Strength of solution : (8 Marks)

Solute, solvent, solution, Types of solution, Preparation of Standard solution: equivalent weight of Acid and Base, Eq wt of acid salt, Eq Wt of an ion, Oxidizing and reducing agents. % w/w, w/v, v/v ; Mole fraction, Molality, Molarity, Normality (their definition, mathematical expressions and numerical problems)

UNIT-2: INORGANIC CHEMISTRY: [15 MARKS]

(a) Metallurgy :

Extraction of Ag, Zn, Pt from their respective chief ore, **electroplating** (**5 M)**

(b) Water pollution & Water Analysis: **(5 Marks)**

Sources of water pollution, Effect of polluted water on human health, BOD, COD, DO and their determination methods, Analysis of hardness of water in terms of Total solid and volatile solid, Non-filterable solid and non-filterable volatile solid, Filterable solids, Total solid, Total suspended solid, Acidity, Alkalinity (Basicity), Turbidity; Various methods of determination of Hardness of water .

(c) Aqueous systems : (5 Marks)

Solutions buffer solution, buffer capacity, buffer index, buffer type and their uses, calculations of pH of buffer mixture, Hydrolysis of salt, relation between Kh, Kw, Ka, Kb. Acid base indicators theory, Acid base titration and choice of suitable indicator, Galvanic cell, common reversible electrodes (S.H.E, metal electrodes, calomel electrodes).

UNIT-3 : ORGANIC CHEMISTRY : I [15 MARKS]

(a) Aromatic Hydrocarbons: **(7 Marks)**

Benzene, source of electrons, Electrophilic Substitution Reactions of Benzene

(Nitration, Sulfonation, Chlorination, Friedel – Crafts alkylation using alkyl halide, alcohol and alkene , Friedel – Crafts Acetylation)with mechanism with energy profile graph , Directive influence of substituents, Disubstitution in Benzene (No mechanism) , Inter conversions of substituents, Conversions with two or three steps. For example : Convert Benzene into Resorcinol, / m-Chloro nitro benzene / Acetanilide / Benzoic acid / p-or m-Nitro benzaldehyde or Benzoic acid etc.

(b) Few Organic Molecules: (8 Marks)

Preparations, Physical and Chemical Properties and uses of Ethyl Chloride, Chloroform, Carbon tetra Chloride, Chloro benzene, Ethanol, Phenol , HCHO, CH_3CHO, C_6H_5CHO, CH_3COCH_3 (Halo form reaction , addition with HCN, $NaHSO_3$, R-Mg-X, Acetal formation , Reaction with Ammonia derivatives (NH_2-Z) , Aldol condensation. Oxidation and reduction and polymerization.

UNIT-4 : ORGANIC CHEMISTRY: II [15 MARKS]

(a) Mono carboxylic acids (6 Marks)

Structure and Nomenclature, Preparation and Chemical Reactions of Formic acid, Acetic acid and Benzoic acid. Nomenclature of dibasic acids, Preparations and Chemical reactions of oxalic acid, Succinic acid and Phthalic acid

(b) Dicarboxylic acids and Acids derivatives: (9 Marks)

Formation of and chemical reactions of acid chloride , amide, ester, anhydride to be treated in brief, for both aliphatic and aromatic covering organic compounds Acetyl Chloride and Benzoyl Chloride, Acetamide and Benzamide, Ethyl acetate and Ethyl benzoate Succinic anhydride and Phthalic anhydride.

KSKV Kachchh University: BHUJ

FIRST YEAR B.Sc.: Semester: II (TWO)

SUBJECT: GENERAL CHEMISTRY (**CECH-202**)

Total Marks: 60, Duration: TWO Hours
Passing standard: 24 Marks

PATTERN OF QUESTION PAPER

FOR SEMESTER-END EXAMS

1. **Internal options are compulsory (i.e. Q.1 or Q.1; Q.2 or Q.2 etc.)**
2. **There are four questions (Q. 1 to Q. 4) each question carries 15 marks The structure for the questions is as under:**

Questions	Section	Marks
Question – 1 UNIT – I	**A (Objective type) *(no internal option)***	**5 marks**
	B (Descriptive - Essay type - Short notes *with internal option)*	**10 marks**
Question – 2 UNIT – II	**A –do-**	**5 marks**
	B –do-	**10 marks**
Question – 3 UNIT – III	**A –do-**	**5 marks**
	B –do-	**10 marks**
Question – 4 UNIT – IV	**A –do-**	**5 marks**
	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: B. Sc: SEMESTER: II (TWO)
GENERAL CHEMISTRY PRACTICAL

Max Marks: 30 Duration: 4 Hours

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

Q.1: Organic Spotting: (15 compounds to be identified) **10 Marks**

Compounds containing one Functional group be given:
Acids: Acetic acid, Oxalic acid, Succinic acid, Benzoic acid, Salicylic acid,
Phenol: Phenol, α- Naphthol, β- Naphthol
Base: Aniline, p-Toluidine.
Neutral: Liquids : Nitro benzene, Benzaldehyde, Ethyl acetate, Methyl acetate,Acetone, Methanol , Ethanol, Bromobenzene, Chloroform, Benzene.
Solids: Benzamide, Naphthalene, Urea, Thiourea, m-Dinitrobenzene, Acetanilide, Glucose,

Q.2 Inorganic TWO STEP Volumetric Analysis: **10 Marks**

Standard solution to be given to the students:

(1) **Use of 0.05 N – 0.1 N Na_2CO_3 to determine the strength of given xN HCl and thence xN NaOH**

(2) **Use of 0.05 N – 0.1 N Oxalic acid to determine the strength of xN $KMnO_4$ and thence x N $FeSO_4.7H_2O$ / x N FAS . 6 H_2O**

(3) **Use of 0.05 N – 0.1 N $KMnO_4$ to determine the strength of given solutions of x N FAS. 6 H_2O and thence x N $K_2Cr_2O_7$.**

(4) **Determination of Acetic acid in Commercial Vinegar using 0.1 M NaOH . NaOH to be standardized using 0.1 N Succinic acid**

(5) **To determine the strength of each component in a mixture of $NaHCO_3$ + Na_2CO_3 using 0.1 N HCl .**

(6) **To determine the strength of each component in a mix of Oxalic acid + H_2SO_4 using 0.02 M $KMnO_4$ and 0.1 M NaOH.**

(7) **To determine the strength of each component in a mixture of $H_2C_2O_4.2H_2O$ + $K_2C_2O_4.H_2O$ using 0.1 M NaOH and 0.02 M $KMnO_4$ solution.**

Q.4	**Five short questions related to practicals only.**	**5 Marks**
Q.5	**Certified journal :**	**5 Marks**

Note : Student shall not be allowed to appear in the examination if he / she does not produce certified journals.

Kachchh University: B. Sc : SEMESTER : II (TWO)
GENERAL CHEMISTRY PRACTICAL (CECH-202 P)
Total Marks: 30 ; Duration : Four Hours
Passing standard : 12 Marks

(A) Organic Spotting : **10 Marks**

a) MP / BP
b) Preliminary Observation
c) Nature of substance
d) Other tests (four)
e) Lassigne's Test (tests one each for Nitrogen , Sulfur and Halogen)
f) Functional group tests
g) Confirmative tests
h) Result with name and structure

(B) TWO Step Volumetric Analysis: **10 Marks**

Standard solution to be given to the candidates
Step: I (Reading + Calculation): 5 M
Step: II (Reading + Calculation): 5 M

Over all result in tabular form

(C) Certified Journal: **5 Marks**

(D) Short Answers: **5 Marks**

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K S K V KACHCHH UNIVERSITY

First B. Sc: SEMESTER: II (TWO)

PRACTICALS EXAMINATION

Subject: GENERAL CHEMISTRY (CECH-202 P)

March / April: _____

Total Marks: 30 Duration: Four Hours

G E N E R A L Q U E S T I O N P A P E R

NB: (1) On the Answer book, write your seat no. and table no.

(2) You are given separate answer books for each question.

(3) MP / BP of organic compound should be initialed by one of the examiners.

(4) Within first 10 minutes, write the answers in the given slip.

Q.1 You are given an **Organic** substance in the beaker No **A** ____.
Identify the compound by carrying out various tests like solubility, Lassigne's tests, Functional group tests, MP/BP etc . **(10 M)**
Give the systematic complete report.

Q.2 **Two Step Titration:**
You are given _____ N aq. solution of _____in container **B**.
Use it to find out the strength of aq. solution of _____
Given the container No. **C** and hence the strength aq solution of in the container **D** in terms of Normality , gm/l , and Molarity. **(10 M)**

Q.3 Write the short answers in the given slip within first 10 minutes of the practical **(5 M)**

Q.4 Certified Journal: **(5 M)**

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KACHCHH UNIVERSITY : F Y B Sc: GENERAL CHEMISTRY

Reference Books:

(A) Physical Chemistry :

1. Physical chemistry : P.W.Atkins,
2. Elements of Physical Chemistry : Samuel Glasstone .
3. Principles of Phys. Chem : B.R.Puri, L.R.Sharma and Pathania, 41st edition.
4. A text book of Physical Chemistry : P L Soni , O P Dharmarha & UN Dash
5. Physical Chemistry : D R Pandit , A R Rao & Padke

(B) Inorganic Chemistry :

1. Concise Inorganic Chemistry: J.D.Lee, Chapman and Hall, 5th ed., 1996.
2. Basic Inorganic Chemistry : F A Cotton & G Wilkinson
3. Valence and Molecular Structure: Cartmell & Fowels
4. Atomic Structure and Chemical Bonding : Manas Chanda
5. Principles of Inorganic Chemistry : B R Puri, L R Sharma & K C Kalia

(C) Organic Chemistry :

1. Text Book of Organic Chemistry : P L Soni & H M Chawla : Sultan Chand
2. sons, New Delhi
3. Organic Chemistry : R T Morrison and R N Boyd , 6th Ed, Prentice Hall
4. A Text book of Organic Chemistry : R K Bansal , 3rd Ed, 2002, New Age International , New Delhi
5. Advanced Organic Chemistry : Arun Bahl & B S Bahl, 2004
6. Reaction Mechanism in Organic Chemistry : S M Mukherji & S P Singh; S.Chand & Co. Ltd, New Dehli
7. Reaction mechanisms and reagents in organic Chemistry : Gurdeep Chatwal
8. Basic Course in organic Chemistry : Ramesh Luhana

(D) Analytical Chemistry :

1. Water Analysis and Water Pollution by V P Kudesia
2. Instrumental methods and Chemical Analysis : B K Sharma
3. Instrumental methods and Chemical Analysis : Chatwal Anand
4. Book for water Analysis: R K Trivedi & V P Kudesia
5. Inorganic Qualitative Analysis : Vogel, Gehani .