Printed Page:- **Subject Code:- AAS0102**

Roll. No:

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA

(An Autonomous Institute Affiliated to AKTU, Lucknow)

B.Tech

SEM: I - CARRY OVER THEORY EXAMINATION - MAY 2023

Subject: Engineering Chemistry

Time: 3 Hours **Max. Marks: 100**

General Instructions:

IMP: *Verify that you have received the question paper with the correct course, code, branch etc.*

1. *This Question paper comprises of* **three Sections -A, B, & C.** *It consists of Multiple Choice Questions (MCQ's) & Subjective type questions.*

2. *Maximum marks for each question are indicated on right -hand side of each question.*

3. *Illustrate your answers with neat sketches wherever necessary.*

4. *Assume suitable data if necessary.*

5. *Preferably, write the answers in sequential order.*

6. *No sheet should be left blank. Any written material after a blank sheet will not be evaluated/checked.*

SECTION A **20**

1. Attempt all parts:-

1-a. The liquid lubricants stick due to the _____ property. (CO1) 1

(a) Surface tension

(b) Viscosity

(c) Temperature coefficient

(d) Mass of the liquid

1-b. Which of the following is NOT Secondary Fuel? (CO1) 1

(a) Petrol

(b) Diesel

(c) Natural Gas

(d) Kerosene

1-c. In a single-component system, if degree of freedom is zero, maximum number of phases that can co-exist (CO 2) 1

(a) 0

(b) 1

(c) 2

(d) 3

1-d. The presence of bicarbonates of calcium and magnesium cause (CO 2) 1

(a) Temporary Hardness

(b) Permanent hardness

(c) Total hardness

(d) none of these

1-e. The gas used to inflate Air Bag is (CO 3) 1

(a) Air

(b) Oxygen

(c) Helium

(d) Nitrogen

1-f. Which among following can NOT be used for Sacrificial Coating of Iron? (CO3) 1

(a) Zinc

(b) Magnesium

(c) Silver

(d) Aluminium

1-g. Soda bottles are made up of (CO 4) 1

(a) Polyethylene Terephthalate

(b) Polyester

(c) Polystyrene

(d) Poly Styrene Butadiene

1-h. If the arrangement of functional groups on carbon chain is alternating. It is called (CO 4) 1

(a) isotactic

(b) syndiotactic

(c) atactic

(d) tacticity

1-i. Schottky defect is observed in crystals when _____. (CO 5) 1

(a) some cations move from their lattice site to interstitial sites.

(b) some lattice sites are occupied by electrons

(c) the equal number of cations and anions are missing from the lattice

(d) some impurity is present in the lattice

1-j. In IR spectroscopy, the vibration between atoms is caused by which of the following? (CO 5) 1

(a) The overall molecular weight of the molecule

(b) Dipole moments between atoms

(c) The movement of electrons to higher energy levels

(d) The number of protons in a nucleus

2. Attempt all parts:-

2.a. Give the formula to calculate % of C & H by ultimate analysis. (CO1) 2

2.b. Why Zeolite process is called Permutit Process? (CO 2) 2

2.c. What is Hot dipping? (CO 3) 2

2.d. Why is bakelite used in electrical appliences ? (CO4) 2

2.e. Give two examples of Chromophore. (CO 5) 2

SECTION B **30**

3. Answer any <u>five</u> of the following:-

3-a. What is basic principle of Bomb Calorimeter? With the help of a neat diagram explain its working and corrections.(CO1) 6

3-b. Explain how BSES standards are playing important role to minimize air pollution? (CO1) 6

3-c. State the phase rule and discuss phase rule for water system. (CO 2) 6

3-d. Calculate temporary hardness and total hardness of a sample of water containing: $Mg(HCO_3)_2$ = 7.5 mg/L; $Ca(HCO_3)_2$ = 16 mg/L; $MgCl_2$ = 9 mg/L; $CaSO_4$ = 13.6 mg/L (CO 2) 6

3.e. What is fuel cell? Describe H_2-O_2 Fuel Cell in brief. (CO3) 6

3.f. Give the preparation, properties and application of following polymers: Buna-S, Terylene, Nylon 6. (CO4) 6

3.g. How many molecular vibration are found in linear and non-linear molecules? Give types of Bending vibrations in IR spectroscopy. (CO 5) 6

SECTION C **50**

4. Answer any <u>one</u> of the following:-

4-a. What is rank of coal? Describe proximate and ultimate analysis of coal. (CO1) 10

4-b. What are Lubricants? Give their mechanism. (CO1) 10

5. Answer any <u>one</u> of the following:-

5-a. Discuss the Ion-Exchange or deionization or demineralization process for the 10

treatment of hard water with its advantages and disadvantages. (CO2)

5-b. A water sample was found to contains the following salts in mg/l: $CaSO_4$ = 20.4, $MgCl_2$ = 9.5 and HCl = 7.3 Calculate the quantity of lime (85% pure) and soda (80% pure) required for softening 80,000 litres of water. What would be the total cost of chemicals if lime and soda are Rs. 9 and Rs. 35 per Kg? (CO 2) 10

6. Answer any <u>one</u> of the following:-

6-a. What is corrosion? Explain electrochemical theory of corrosion. (CO3) 10

6-b. What do you mean by battery. Give reactions of charging and discharging of lead storage battery. (CO 3) 10

7. Answer any <u>one</u> of the following:-

7-a. Describe in brief about conducting and biodegradable polymers with their applications. (CO4) 10

7-b. Give the example of some polymeric composite materials with their commercial application (CO 4) 10

8. Answer any <u>one</u> of the following:-

8-a. What is lambert-beer's law? Describe the various electronic transition in the UV Spectroscopy. (CO 5) 10

8-b. How can you distinguish $CH_3CH_2CH_2CHO$ from $(CH_3)_2CH$ CHO by NMR spectroscopy? (CO 5) 10