Printed Page:- 04 **Subject Code:- AAS0102**

Roll. No:

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA
(An Autonomous Institute Affiliated to AKTU, Lucknow)
B.Tech
SEM: I - THEORY EXAMINATION (2023 - 2024)
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. Which stage of vehicle emission norms presently applicable in India in Internal combustion engine? (CO1) 1

(a) Bharat Stage III
(b) Bharat Stage V
(c) Bharat Stage VI
(d) Bharat Stage IV

1-b. The requirements for combustion is/are (CO1) 1

(a) Fuel
(b) oxygen
(c) heat
(d) all of these

1-c. Hardness of water is conventionally expressed in terms of equivalent amount of _____ (CO2) 1

(a) H_2CO_3
(b) $MgCO_3$
(c) $CaCO_3$
(d) $Na_2 CO_3$

1-d. How many grams of $MgCO_3$ dissolved per litre gives 84 ppm hardness?(CO 2) 1

(a) 70.56 mg/L

(b) 48.23 mg/L

(c) 81.49mg/L

(d) 66.12 mg/L

1-e. Which of the following is false regarding galvanic cells? (CO3) 1

(a) It converts chemical energy into electrical energy

(b) The electrolytes taken in the two beakers are different

(c) The reactions taking place are non-spontaneous

(d) To set up this cell, a salt bridge is used

1-f. The full form of LCD is _____(CO 3) 1

(a) Liquid Crystal Display

(b) Liquid Crystalline Display

(c) Logical Crystal Display

(d) Logical Crystalline Display

1-g. The functionality of ethylene glycol is ----------. (CO4) 1

(a) 3

(b) 4

(c) 2

(d) 5

1-h. Which polymer is used for making unbreakable crockery? (CO4) 1

(a) Melamine Formaldehyde

(b) Addition polymer

(c) Thermoplastic

(d) None of these

1-i. Which type of defect are point defects? (CO 5) 1

(a) Zero dimensional defect

(b) One dimensional defect

(c) Two dimensional defect

(d) Three dimensional defect

1-j. Select the wavelength range corresponding to UV-visible region.(CO5) 1

(a) 400-800 nm

(b) 200-800 nm

(c) 25 μm-2.5 μm

(d) 2.5 μm – 1mm

2. Attempt all parts:-

2.a. How do you calculate GCV of solid or liquid fuel? (CO1) 2

2.b. What is hardness of water? (CO 2) 2

2.c. Discuss any two methods of corrosion control.(CO 3) 2

2.d.	What are doped conducting polymers? Define p- doping and n-doping.(CO4)	2
2.e.	In C_{60} molecule there are ___ hexagons and ___ pentagons. (CO 5)	2

SECTION-B 30

3. Answer any five of the following:-

3-a.	What are the applications of Lubricants? (CO1)	6
3-b.	A 2.499 gms of coal sample was taken in silica crucible and heated in oven maintained at 110 ^{o}C for one hour. The weight after heating was 2.368 gms. The same sample was analysed for volatile matter and weight obtained was 1.75 gms the sample as further treated to get fixed carbon of 0.95 gms. Calculate the percentage of moisture, volatile matter, ash and fixed carbon for this sample. (CO1)	6
3-c.	What do you mean by boiler feed water? Explain the calgon conditioning method of descaling. (CO2)	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 Galvanic Cell? describe it's working and construction. (CO 3)	6
3.f.	Classify the polymers on the basis of their tacticity and give suitable examples. (CO 4)	6
3.g.	Compare the Top to down and Bottom to up approaches of nanotechnology. (CO 5)	6

SECTION-C 50

4. Answer any one of the following:-

4-a.	Discuss Bomb calorimeter method for determination of calorific value of solid fuel. Give various corrections. (CO1)	10
4-b.	What do you mean by calorific value? What is the difference between Gross calorific value and Net calorific value and give their relation? (CO1)	10

5. Answer any one of the following:-

5-a.	Explain Zeolite process of removing hardness of water with advantages and disadvantages.(CO 2)	10
5-b.	Draw neat and labeled phase diagram of water system and explain it (CO2)	10

6. Answer any one 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 one of the following:-

7-a.	Write the structure, preparation, and applications of following polymers: Nylon-6,6; Terylene, Bakelite (CO4)	10
7-b.	Write short note on: Conducting Polymers, Biodegradable Polymers (CO4)	10

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

8-a.	Describe the types of Crystal Defects. (CO 5)	10
8-b.	How many types of electronic transition shown by the molecule in UV-visible spectroscopy? (CO5)	10