Printed Page:- Subject Code:- AAS0202

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NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA

(An Autonomous Institute Affiliated to AKTU, Lucknow)

B.Tech.

SEM: II - THEORY EXAMINATION (2020 - 2021)

Subject: Engineering Chemistry

Time: 03:00 Hours Max. Marks: 100

General Instructions:

- All questions are compulsory. It comprises of three Sections A, B and C.
- Section A - Question No- 1 is objective type question carrying 1 mark each & Question No- 2 is Very short type questions carrying 2 marks each.
- Section B - Question No- 3 is Long answer type - 1 questions carrying 6 marks each.
- Section C - Question No- 4 to 8 are Long answer type -2 questions carrying 10 marks each.

SECTION A 20

1. Attempt all parts:-

1-a. Burning fossil fuels lead to (CO1) 1

1. Global warming
2. acid rain
3. air pollution
4. all of these

1-b. Which stage of vehicle emission norms presently applicable in India in Internal combustion engine? (CO1) 1

1. Bharat Stage III
2. Bharat Stage V
3. Bharat Stage VI
4. Bharat Stage IV

1-c. Which of the following method is also known as Deionization / demineralization process? (CO 2) 1

1. Calgon Process
2. Zeolite Process
3. Ion Exchange Process
4. Reverse Osmosis

1-d. The degree of freedom at triple point for water system_____. (CO 2) 1

1. 0
2. 1
3. 2
4. 3

1-e. Which among the following can NOT be used for Noble Coating of Iron? (CO 3) 1

1. Nickel
2. Chromium
3. Platinum
4. Magnesium

1-f. Generally electrode potential refers to _____ (CO 3) 1

1. Oxidation potential
2. Reduction potential
3. Electron potential
4. Cannot be determined

1-g. Natural rubber is basically a polymer of (CO 4) 1

1. isoprene
2. propylene
3. ethylene
4. chloroprene

1-h. The least functionality of a monomer is convert into polymer is (CO 4) 1

1. 1
2. 3
3. 2
4. 6

1-i. For a particular vibrational mode to appear in the Raman spectrum, what must change? (CO 5) 1

1. Frequency of radiation
2. Intensity of radiation
3. Molecule's shape
4. Molecule's polarizability

1-j. The representation of Beer Lambert's law is given as A = abc. If 'b' represents distance, 'c' represents concentration and 'A' represents absorption, what does 'a' represent? (CO 5) 1

1. Intensity
2. Transmittance
3. Absorptivity
4. Admittance

2. Attempt all parts:-

2-a. What is Dulong's Formula? (CO1) 2

2-b. What is $CaCO_3$ equivalent? (CO 2) 2

2-c. Why is salt bridge used in the construction of cell?(CO 3) 2

2-d. What is co-polymerization? Give one example? (CO 4) 2

2-e. What is chromophore? (CO 5) 2

SECTION B 30

3. Answer any five of the following-

3-a.	The ultimate analysis of a coal(moist basis in %): C 69.8 , H 4.6 , N 1.4, O 8.5, S 2.5, H_2O 4.5 and ash 8.7. Calculate, by means of the Dulong's formula, the gross calorific value, of the coal	6
3-b.	What do you understand with term lubricant? Give their mechanism (CO1)	6
3-c.	A zeolite bed, on softening 7000 litres of hard water, required 60 litres of 10% NaCl solution for regeneration. Calculate the hardness of water in ppm	6
3-d.	Why does soap do not give lather with hard water?(CO 2)	6
3-e.	Explain sacrificial coating and nobel coating (CO 3)	6
3-f.	What do you mean by synthetic rubber and give two example with their structure? (CO 4)	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 one of the following-

4-a.	What are Lubricants? Give their mechanism. (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.	A water sample contains: $Mg(HCO_3)_2$ = 73mg/L, $CaCl_2$ = 222mg/L, $MgSO_4$ = 12mg/L, $Ca(HCO_3)_2$= 162mg/L Calculate the quantity of lime (74% pure) and soda (90% pure) for softening 50,000 L of water	10
5-b.	Give a brief description of the following: Triple Point, Metastable Curve, Phase, Component, Degree of Freedom (CO 2)	10

6. Answer any one of the following-

6-a.	What is metallic bond? Explain it on the basis of MOT? (CO 3)	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 short note on: Conducting Polymers, Biodegradable Polymers (CO 4)	10
7-b.	Write the preparation and uses of following polymers: Buna-N, Buna-S, Neoprene (CO 4)	10

8. Answer any one of the following-

8-a.	What are stock and anti-stock lines? Give difference between IR and Raman spectroscopy? (CO 5)	10
8-b.	How many types of electronic transition shown by the molecule in UV-visible spectroscopy? (CO 5)	10