Paper Id: 199122 Roll No: | | | | | | | | | | | | | |

B. TECH.
(SEM-I) THEORY EXAMINATION 2019-20
ENGINEERING CHEMISTRY

Time: 3 Hours ***Total Marks: 100***

Note: Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt *all* questions in brief **2 x 10 = 20**

a) What is copolymeriszation? Give two example.
b) Write the difference between Homopolymer and Copolymer.
c) Discuss the classification of Fuels.
d) Explain Frenkel defect with diagram.
e) Explain hardness of water.
f) State the significance of triple point.
g) Why a block magnesium attached through an insulated metallic wire to an underground pipeline.
h) Why is graphite used as lubricant?
i) Define the term chromophores and Auxochrome, in U.V. spectroscopy
j) Write the electrode reaction of galvanic cell.

SECTION B

2. Attempt any *three* of the following: **10 x 3 = 30**

a) What do you understand by temporary hardness and permanent hardness of water? Describe the Zeolite process for removal of hardness from water.
b) What are composites? Give their classification and applications.
c) With the help of Molecular orbital diagram explain why NO molecule is paramagnetic.
d) What is Portland cement? Give the chemical reaction involved during setting and hardening of Cement.
e) What is Lambert's-Beers law in UV visual spectroscopy? Also, explain the role of TMS in NMR spectroscopy.

SECTION C

3. Attempt any one part of the following: **10 x 1 = 10**

a) Explain the process of scale and sludge formation in boilers. How can this be prevented?
b) A water sample contains $CaSO_4$= 16.2 mg/l, $Mg(HCO_3)_2$ = 29.2 mg/l and $CaSO_4$ = 13.4 mg/l. Calculate temporary, and permanent hardness. Convert the ans in ppm, degree clark, degree french.

4. Attempt any one part of the following: **10 x 1 = 10**

a) Describe construction and working of Galvonic cell with the help of diagram?
b) Calculate temporary hardness from the following data from the soap titration method, when 50 ml of water is titrated with soap solution :

(i) Lather factor = 0.3 ml soap solution

(ii) total hardness = 9.3 ml soap solution

(iii) permanent hardness = 3.1 ml soap solution

(iv) Standard hardness water (200mg\L of $CaCO_3$) = 18.3 ml.

5. Attempt any one part of the following: 10 x 1 = 10

a) What is organ metallic compound? Give the reaction of CH_3CH_2MgBr with CO_2, SO_2, CS_2, CH_3COCH_3 and CH_3OH.

b) Define phase rule. Apply phase rule to water system.

6. Attempt any one part of the following: 10 x 1 = 10

a) Calculate the cost of lime and soda required for softening 1 million litres of water containing
$Mg(HCO_3)_2$ = 73mg/l,
$MgSO_4$ = 120 mg/l,
$CaSO_4$ = 68 mg/l,
$CaCl_2$ = 111 mg/l.
The cost of lime of 80% purity is Rs200 per metric tone and that of soda of 90% purity is Rs 12,000 per metric tonne.

b) How do you prepare the following polymers:
(i) Bakelite (ii) Dacron (iii) SBR (iv) NBR (v) Nylon 6

7. Attempt any one part of the following: 10 x 1 = 10

a) Define the term Chromospheres and Auxochrome in UV spectroscopy.
An organic Compound having molecular formula C_7H_60 shows absorption peaks at 3010, 2700, 1600, 1580, 1520, 1480, and 1270 cm1 in its IR spectrum. Suggest its structure.

b) Explain reverse osmosis. 100 ml of water sample has hardness equivalent of 12.5 ml of 0.08 N $MgSO_4$. What is its hardness in ppm?