Code : 231201

B.Tech 2nd Semester Examination, 2017

Engineering Chemistry

Time : 3 hours *Full Marks : 70*

Instructions :

(i) *There are **Nine** Questions in this Paper.*

(ii) *Attempt **Five** questions in all.*

(iii) ***Question No. 1 is Compulsory.***

(iv) *The marks are indicated in the right-hand margin.*

1. Fill in the blanks/Answer any seven questions: 2×7=14

(a) Arrange the following solution in the increasing order of freezing point.

0.2M Ferric nitrate soln., 0.4 m sugar solution, 0.1M acetic acid solution and 0.2 M magnesium chloride soln.

(b) Define lather factor.

(c) The hardness of water containing 1.2 mg $MgSO_4$, 1.42 mg Na_2SO_4 and 1.11 mg $CaCl_2$ in 500 ml. Solution is ..... ppm and ..... ^0Cl.

(d) What is gutta pereha?

(e) Why small anodic area results in intense corrosion?

(f) 0.1M urea solution is ..... to 0.1M Formic acid solution.

(g) What is power alcohal ?

(h) Plexiglass is polymer of .....

(i) Why does of a nail past inside the wood undergo corrosion easily?

(j) Why are liquid fuels better than solid fuels ? (Three Characters)

2. (a) What are ion-exchange series? 4

(b) Describe ion-exchange process of softening of water. 6

(c) How are spent series are generated ? 4

3. (a) How analysis of flue gas is done by orsat's apparatus? What conclusion you draw? 6

(b) Give the significance of proximate and ultimate analysis of coal. 4

(c) A coal sample contains 82% Carbon, 6% Hydrogen 5% Oxygen, 4% Sulphur and 3% Nitrogen. Find Gross and Net calorific value of coal. 4

4. (a) What is Tactility in polymers? 4

(b) What is glass Transition temperature? 4

(c) Give the method of preparation and uses (Three) of the following. 6

(i) Neoprene

(ii) ABS polymer

(c) Bakelite

5. (a) Give the limitations of Raoult's law. 4

(b) Find the molality of solution containg a non-volatile solute if its Vapour pressure is 3.2% below to the vapour pressure of pure water. 4

(c) Deduce the relation between the elevation of boiling point and mole fraction of dissolve solute. 6

6. (a) What are functions of salt bridge in the Galvanic cell? 4

(b) Can we store (explaination also) 6

(i) $CuSO_4$ Solution in Nickel vessel

(ii) $FeSO_4$ Solution in copper vessel

(iii) $NiCl_2$ Solution in silver vessel

$E^\circ Cu^{+2}/cu=0.34V$ $E^\circ Fe/Fe^{+2}=0.44$ $E^\circ Ag^+/Ag=0.8V$

$Ni/Ni^{+2} = 0.25V$

(c) The emf of a cell corresponding to the reaction 4

$M(s) + 2H^+ \rightarrow M^{+2}(0.02M) + H_2(1atm)$ is

0.46 V at 25°C. Find the pH of acid solution ($E^\circ m/m^{-2}$= 0.76V)

7. (a) What are causes that generate cathode and anode regions on the metal surface ? 4

(b) Discuss the mechanism of wet corrosion. 4

(c) Discuss the importance of design and material selection in controlling corrosion. 6

8. What are the causes and method prevention of the following: $3 \cdot 5 \times 4$

(a) Scale formation

(b) Caustic embrittlement

(c) Priming and foaming

(d) Boiler corrosion

9. Write short note on:

(a) Waterline corrosion

(b) Pitting corrosion

(c) Colligative properties

(d) crevice corrosion

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