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(2066)

16023(J) J-16

B. Tech 2nd Semester Examination

Engineering Chemistry (NS)

NS-103

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

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.

Note : Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C, and D of the question paper and all the subparts of the questions in section E.

SECTION - A

1. (i) Define specific conductance and equivalent conductance. Derive the relationship between them.

   (ii) What are reference electrode? Discuss the construction and limitations of glass electrodes.

   (iii) Write the electrode reactions and calculate the EMF of following cell at 298K. Given that E^{o}_{cell}=1.3V.

   $Cu(s) / Cu^{2+} (0.01M) // Ag^{+} (0.01M) / Ag(s)$ (7+8+5=20)

2. (i) Explain phase rule with the help of two component system. Give the practical applications of this system.

   (ii) Describe the phase diagram for Lead-Silver two component system.

   (iii) What are the differences between phase diagram of one- and two-component systems? (8+8+4=20)

[P.T.O.]

SECTION - B

3. (i) What do you mean by hardness of water? How it is classified?

   (ii) Mention the disadvantages of using hard water for domestic purpose.

   (iii) Write a note on scale and sludge formation.
   (7+7+6=20)

4. What is corrosion? Describe the theory of corrosion and various factor affecting the corrosion. How corrosion be prevented?
   (2+12+6=20)

SECTION - C

5. (i) Explain the principle of NMR spectroscopy.

   (ii) Discuss the various applications of UV-visible spectroscopy.

   (iii) Write a note on shielding and de-shielding effect.
   (7+8=5=20)

6. (i) What is the process of cracking? What are the advantages of catalytic cracking over thermal cracking?

   (ii) Write notes on (a) Water gas (b) Producer gas

   (iii) Explain why: A good fuel must have low ash content.
   (8+8+4=20)

SECTION - D

7. What are polymers? How are they classified? Explain types of polymerisations. Discuss some important applications of commercial polymers. (2+5+5+8=20)

8. (i) What are composite materials, their types and their important properties? What are the applications of different types of composites?

(ii) What are the advantages of composite materials over traditional materials? (15+5=20)

SECTION - E

9. (i) What are different types of concentration cells?

(ii) What is EMF of a cell?

(iii) What is meant by the term component?

(iv) Explain why hard water does not produce leather with soap.

(v) Explain briefly the reaction during the rusting of Iron.

(vi) Give differences between fluorescence and phosphorescence.

(vii) Write a note on gaseous fuel.

(viii) Why is teflon highly chemical resistant?

(ix) What is meant by degree of polymerisation?

(x) What are the causes of failure of composites?

(2×10=20)