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S 4025

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2007.

Second Semester

Civil Engineering

CY 1152 — CHEMISTRY — II

(Regulation 2004)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Calculate the magnetic moment of Fe^{3+} ion.
2. What are the forces responsible for the solubility of O_2 and HCl molecules in water?
3. What is the effect of tacticity on crystallinity of polymer?
4. What is the structural change that occurs during vulcanization of natural rubber?
5. What are protective and non protective oxides? What are the criteria for an oxide to be protective?
6. Compare the mechanisms of galvanic and differential aeration corrossions.
7. Give the composition of white Portland cement and water proof cement.
8. What are the applications of fibre reinforced composites?
9. Compare the qualities of treated water employing Zeolite and ion exchange processes.
10. Compare desalination by reverse osmosis and electro dialysis method.

PART B — (5 × 16 = 80 marks)

11. (a) (i) Draw the MO energy level diagrams of N₂ and O₂ molecules and prove that O₂ molecule is paramagnetic whereas N₂ is not. (6)
- (ii) Discuss the crystal field splitting in octahedral and square planar, complexes. (10)

Or

- (b) (i) Write short note on the influence of hydrogen bonding on the properties of substances. (6)
- (ii) How do interaction of atomic orbitals in metals result in bands in metals. How do you account for the conductive, semi conductive and insulating nature of materials using band theory? (10)
12. (a) (i) Write the mechanism of radical chain polymerization. (6)
- (ii) How are polystyrene and polymethylmethacrylate prepared industrially? What are their applications? (10)

Or

- (b) (i) What is the effect of molecular weight and bulkiness of side group on the glass transition temperature of polymers? (6)
- (ii) Write the mechanism of stereoregular polymerization. (5)
- (iii) What are the common methods of fabrication of thermoplastics? Describe any one method. (5)
13. (a) (i) What are fire retardant and water repellent points? How do they function? (6)
- (ii) What are the metallurgical and environmental factors influencing the rate of corrosion of a metal? Explain. (10)

Or

- (b) (i) State the basic design rules in controlling corrosion. (6)
- (ii) With suitable examples, illustrate the mechanism of galvanic and differential oxygenation corrosion. (5)
- (iii) What are the constituents of points? What are the functions of drying oils and pigments? (5)

14. (a) (i) Write the chemical reactions involved in the setting and hardening of cement. (6)
- (ii) How is carborundum prepared? Give its important applications. (5)
- (iii) Define and classify the different types of composite materials. (5)

Or

- (b) (i) Write notes on weathering of cement and concrete and the means of prevention. (6)
- (ii) Give the preparation and application of high alumina cement. (5)
- (iii) How are glass and carbon fibres made? (5)
15. (a) (i) How are the principles of solubility product and common ion effect applied in the removal of hardness by carbonate and phosphate conditioning? (6)
- (ii) Give an outline of the treatment of water for domestic purpose. (10)

Or

- (b) (i) Explain the reverse osmosis process of treatment of water. (6)
- (ii) List out the external treatment method of boiler feed water and explain any one method in detail. (10)