Code : [illegible]

2 0 1 3

CHEMISTRY

Time : 3 hours Full Marks : 70

Instructions :

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

(ii) There are NINE questions in this paper.

(iii) Attempt FIVE questions in all. Question No. 1 is compulsory.

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

(a) Hardness of sample water containing 1·11 mg/lit $CaCl_2$ and 0·95 $MgCl_2$, 1·42 mg/lit Na_2SO_4 is ___ ppm.

(b) Terylene is condensation polymer of ___ and ___.

(c) What is Pilling-Bedworth law?

(d) Colligative properties of diluted [illegible] ___.

(e) [illegible]

(f) Why boiling point of water increases when NaCl is added?

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

(h) Gutta-percha is polymer of ——

(i) Define octane number.

(j) Aluminium vessels are used to store conc. HNO_3. Explain.

2. (a) Write the principle of lime-soda process of softening of hard water. 5

(b) What are the causes of boiler corrosion? How is it controlled? 5

(c) A 100 ml of water sample is boiled with 25 ml (N/10) Na_2CO_3 solution. The resultant solution is cooled and filtered. The filtrate required 15 ml (N/20) HCl solution for complete neutralization. Calculate the hardness of water sample. 4

(d) What is Raoult's law? Deduce the relation between relative lowering of vapour pressure and osmotic pressure. 3+5

A 3·4% solution of silver nitrate is isotonic with 0·4 M sucrose solution. Calculate the degree of dissociation of silver nitrate. 6

4. (a) Differentiate between thermosetting and thermoplastic resins 4

(b) Describe the free radical polymerization mechanism. 4

(c) Write the preparation and uses of the following : 6

(i) Buna-S

(ii) ABS polymer

(iii) Nylon

5. (a) Explain carbonization of coal 4

(b) Compare the water gas and producer gas in terms of production, composition and calorific value. 4

(c) How is calorific value of a solid determined by bomb calorimeter? 6

6. (a) What is electrode potential and e.m.f of cell? 4

(b) Define glass transition temperature 4

(c) A 100 ml of water sample required 28.4 ml EDTA solution for titration (1 ml EDTA ≡ 1.11 mg $CaCl_2$). Calculate the hardness of the sample water 6

7. (a) Discuss the mechanism of dry and wet corrosion. 5

(b) What are the factors that affect the rate of corrosion? 5

(c) Describe sacrificial anodic protection method of controlling corrosion. 4

8. Describe the methods of prevention of the following : 3½×4=14

(a) Scale and sludge formation

(b) Caustic embrittlement

(c) Priming and foaming

(d) Knocking

9. Write short notes on : 3½×4=14

(a) Water line corrosion

(b) Crevices corrosion

(c) Galvanic series

(d) van't Hoff factor

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