Roll No. 1606453 Total No. of Pages : 3

BT-1/D06 8048

Chemistry

(Common for all Branches)

Paper : CH-101E

Time : Three Hours] Aggarwal Jagadish Maximum Marks : 100

Note :— Attempt FIVE questions in all, selecting at least ONE from each unit. All questions carry equal marks.

UNIT—I

1. (a) State and explain the path functions and state functions. Prove that entropy is a state function. 5

(b) Δ G for a reaction at 300 K is –16 kcal. Δ H for the same reaction is – 10 kcal. Calculate the entropy change at the above temperature. 5

(c) Derive the Clapeyron-Clausius equation in differential and integrated forms for a liquid at its boiling point. 10

2. (a) What is meant by non-variant system ? Discuss in detail all the non-variant systems in case of sulphur system. Justify your answer with a neat, cleaned, labelled sketch of the various phase equilibria. 10

(b) Discuss the salient features of phase diagram of Pb-Ag System 6

(c) Calculate F, C and P in the following cases :

(i) $H_2O(l)$ ⇌ $H_2O(g)$ at 1 atm P and 100°C

(ii) SR ⇌ SM at transition temperature 4

UNIT—II

3. (a) What is meant by alkalinity ? How is it determined ? Mention the possibility of all the combinations of ions (responsible for imparting alkalinity) present in an alkaline water. 7

(b) What are complexometric titrations? Justify the role of these titrations in the estimation of hardness of water. 7

(c) Write a self explanatory note on phosphate conditioning 6

4. (a) What is meant by disinfection of water? Name three microbes which are injurious to health. 5

(b) For what purpose is sedimentation carried out in water treatment? Name two important coagulants used in water treatment. 5

(c) What are ion exchange resins? For what purpose are they used? Discuss the chemistry involved in the softening of water and regeneration of spent exchangers 10

UNIT—III

5. (a) Discuss the electrochemical theory of corrosion with evolution of H_2 and absorption of O_2. 8

(b) Explain any five important factors affecting the rate of corrosion. 8

(c) Discuss the water line corrosion 4

6. (a) Give a brief account of the manufacture of lubricant oil from mineral oil. 6

(b) Mention the differences between soda-base greases and lime-base greases. 4

(c) Discuss

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(i) viscosity and viscosity index

(ii) iodine value of a lubricating oil

Discuss their significance 10

UNIT—IV

7. (a) Discuss the following terms used frequently in polymer technology :—

(i) Syntactic polymers

(ii) Homochain polymers

(iii) Ziegler-Natta coordination polymerisation and

(iv) Condensation polymerisation. 15

(b) Discuss the method of preparation of urea formaldehyde resin. 5

8. (a) What is flame photometry ? Describe its applications and drawbacks. 10

(b) Write short notes on any **TWO** :—

(i) Redox titrations

(ii) Thermogravimetric analysis

(iii) Conductometric titrations 10