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Question Paper Code : 52879

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY, 2019.

First Semester

Civil Engineering

CY 6151 — ENGINEERING CHEMISTRY — I

(Common to all branches except Marine Engineering)

(Regulation 2013)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Define degree of polymerization.
2. Name any two polymerization techniques.
3. State Second law of thermodynamics.
4. List out the significance of entropy
5. State Grotthuss-Draper Law.
6. What is the purpose of an IR spectrophotometer?
7. What is meant by triple point?
8. Mention any two significances of alloy making.
9. What are nanowires?
10. Distinguish between bulk materials and nanomaterials.

PART B — (5 × 16 = 80 marks)

11. (a) (i) Explain any four important properties of polymers. (8)
(ii) Describe the free radical mechanism of polymerization with a suitable example. (8)
- Or
- (b) (i) Distinguish between thermoplastics and thermosetting plastics. (8)
(ii) Briefly explain the preparation, properties and uses of nylon 6:6. (8)

12. (a) (i) Explain the significance of free energy. (8)
(ii) Derive Gibbs — Helmholtz equation. (8)

Or

- (b) (i) Derive any two Maxwell relations. (8)
(ii) ΔG of a reaction at 300 K is -8 K. Cal, ΔH for the reaction is -5 K. Cal. What is the entropy (ΔS) of the reaction? What will be ΔG at 310 K? (8)

13. (a) (i) Explain about the Phosphorescence and Photo sensitization. (8)
(ii) Write an elaborate note on the principle and instrumentation of UV-Visible Spectrophotometer. (8)

Or

- (b) (i) State and explain Stark-Einstein Law. (8)
(ii) Write the statement of Beer-Lambert Law. Derive its mathematical form. What are its limitations? (8)

14. (a) (i) State phase rule and explain the terms involved in it. (8)
(ii) With the help of a neat phase diagram, explain lead-Silver system. (8)

Or

- (b) (i) Explain any four types of heat treatment of steel in detail. (8)
(ii) What are non-ferrous alloys? Explain the composition, properties and uses of any two non-ferrous alloys. (8)

15. (a) (i) Write an explanatory note on nano clusters, nano rods and CNTs. (8)
(ii) Describe the synthesis of nanomaterials by CVD method with a diagram. (8)

Or

- (b) (i) Discuss the size dependent properties of nanomaterials. (8)
(ii) Write an informative note on applications of nanoparticles. (8)