Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 20380

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2018.

First Semester

Civil Engineering

CY 6151 – ENGINEERING CHEMISTRY – I

(Common to all branches except Marine Engineering)

(Regulations 2013)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Brief on the tacticity of polymeric material.

2. List the factors affecting glass transition temperature of polymer.

3. Distinguish reversible and irreversible process.

4. State the criteria for a spontaneous chemical reaction.

5. Define Grotthuss-Drapper law.

6. What is finger print region in IR spectroscopy? Mention its uses.

7. How many phases and components and degree of freedom are present in the following system? $CaCO_3(s) \rightleftharpoons CaO(s) + CO_2(g)$.

8. What is the difference between eutectic and triple point?

9. Distinguish the properties of Nano particles and Bulk particles.

10. What is the principle of CVD method synthesis of nanoparticles?

PART B — (5 × 16 = 80 marks)

11. (a) (i) Distinguish between thermoplastics and thermosetting plastics. (8)

(ii) Write the synthesis of nylon-6,6 and Epoxy resins. (8)

Or

(b) (i) Compare addition polymeriation and condensation polymerization. (8)

(ii) Write notes on bulk, emulsion, solution and suspension polymerization techniques. (8)

12. (a) (i) Derive Gibbs - Helmholtz equation. (12)

(ii) Derive Van't-Hoff isotherm equation. (4)

Or

(b) Derive all the four Maxwell relations. (16)

13. (a) (i) Distinguish the differences in fluorescence and Phosphorescence. (8)

(ii) Discuss the applications of UV-Visible spectroscopy. (8)

Or

(b) (i) Explain the mechanism of energy transfer in photosensitization and quenching process. (12)

(ii) Discuss the mechanism of chemiliminescence. (4)

14. (a) (i) Draw a neat one component water system and explain in detail. (12)

(ii) Explain the following heat treatment processes : (1) Annealing (2) Hardening. (2+2)

Or

(b) (i) What are the types Heat treatable alloy steel. (10)

(ii) Write the composition, properties and uses of various types of Bronze. (6)

15. (a) (i) Discuss the size dependent properties of nanomaterials. (8)

(ii) Write a note on carbon nanotubes and their properties. (8)

Or

(b) (i) Write a note on top-down and bottom-up approach for nanomaterial preparation with examples. (8)

(ii) What are nanoclusters and nanowires? Explain their properties and applications. (8)