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

Question Paper Code : 27653

B.E./B.Tech. DEGREE EXAMINATION, DECEMBER 2015/JANUARY 2016

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. Differentiate between thermosetting and thermoplastic polymers.
2. Brief about tacticity of polymers.
3. State Clausius and Kelvin Statements of second law of thermodynamics.
4. Calculate the entropy change when 10 g of ice is converted into liquid water at 0 °C. Latent heat of fusion of ice is 80 cal/g.
5. Mention the essential condition for a molecule to be IR active.
6. State Lambert-Beer law.
7. What is meant by component ? Give suitable example.
8. State the reduced Phase rule.
9. Differentiate the terms nano rod from nano wire.
10. Why different colours of fluorescence light are observed in nano particles ?

PART – B (16 × 5 = 80 Marks)

11. (a) (i) Write the mechanism of free radical polymerization. **(8)**

(ii) What is glass transition temperature ? Explain factors influencing Tg. **(8)**

OR

(b) (i) Discuss in detail about the emulsion and solution polymerisation techniques. **(8)**

(ii) Give the preparation, properties and uses of nylon 6,6. **(8)**

12. (a) (i) Derive the 4 forms of Maxwell's relations. **(8)**

(ii) Derive the Gibb's Helmholtz equation. Give its two important applications. **(8)**

OR

(b) (i) Derive Clausius – Clapeyron equation. **(8)**

(ii) Derive Vant Hoff's Isochore equation. **(8)**

13. (a) (i) Write the principle, instrumentation and applications of IR spectroscopy. **(8)**

(ii) Explain in detail about types of electronics transition that occur in UV-Visible spectroscopy with suitable examples. **(8)**

OR

(b) (i) Brief about the following : **(8)**
Inter System Crossing, Internal Conversion, Fluorescence and Phosphorescence.

(ii) What is photosensitization ? Discuss its mechanism in detail. **(8)**

14. (a) (i) Draw the phase diagram of water system and explain in detail. **(8)**

(ii) Draw the phase diagram of Zinc-Magnesium system and explain in detail. **(8)**

OR

(b) (i) Draw the phase diagram of lead silver system and explain in detail. **(8)**

(ii) What are the effects of alloying elements ? Give its functions. **(8)**

15. (a) (i) Explain in detail about the preparation of CNT by Laser Ablation method. **(8)**

(ii) Explain about the synthesis of nanoparticles by hydrothermal method. **(8)**

OR

(b) (i) Explain the properties and applications of nanoparticles. **(8)**

(ii) Explain about the synthesis of nanoparticles by electrodeposition method. **(8)**