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

Question Paper Code : 80308

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 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. What are Copolymers?

2. How polymers are classified on the basis of their tacticity?

3. Calculate the change in entropy accompanying the isothermal expansion of 4 moles of an ideal gas at 300K until its volume has increased three times.

4. What are the conditions for a process to be spontaneous based on the relation? $\Delta G = \Delta H - T\Delta S$.

5. Differentiate between photo-chemical and thermochemical reaction.

6. What is finger print region? Mention its important uses.

7. Calculate the number of phases and components present in the following reaction.
   $MgCO_{3(s)} \leftrightarrow MgO_{(s)} + CO_{2(g)}$
   $NH_4Cl_{(s)} \leftrightarrow NH_{3(g)} + HCl_{(g)}$.

8. What is meant by 18/8 steel?

9. What are nanomaterials?

10. Write any two important applications of gold nanoparticles in medicine.

PART B — (5 × 16 = 80 marks)

11. (a) (i) Describe the free radical mechanism of addition polymerisation with a suitable example. (8)

(ii) Write the preparation, properties and uses of

(1) Nylon 6,6

(2) Epoxy resin. (8)

Or

(b) (i) Explain the technique, advantages and disadvantages of

(1) Emulsion polymerization

(2) Suspension polymerization. (8)

(ii) Brief about the following properties of the polymers

(1) Glass Transition Temperature

(2) Weight average molecular weight. (8)

12. (a) (i) Discuss the criteria for a spontaneous chemical reaction. (8)

(ii) Derive Van't Hoff isotherm. (8)

Or

(b) (i) Derive any two Maxwell's relations. (8)

(ii) Derive Gibbs-Helmholtz equation. (8)

13. (a) (i) What is chemiluminescence? Bring out the mechanism of chemiluminescence. (8)

(ii) Explain the mechanism of fluorescence and phosphorescence. (8)

Or

(b) (i) Explain the principle and instrumentation of UV-Visible Spectroscopy with a neat block diagram. (8)

(ii) Write a notes on the types of transitions involved in organic molecule. (8)

14. (a) (i) Draw a neat one component water system and explain in detail. (8)

(ii) Discuss in detail the lead silver system. Explain Patinsion's process. (8)

Or

(b) (i) Write a note on heat treatment of steel. (8)

(ii) Discuss composition, properties and uses of non-ferrous alloys. (8)

15. (a) (i) Describe any two methods of synthesizing carbon nanotubes. (8)

(ii) Distinguish molecules, nanoparticles and bulk materials. (8)

Or

(b) (i) Discuss the applications of Nano chemistry in biology and medicine. (8)

(ii) Explain about the properties of nanomaterial. (8)
