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

Question Paper Code : X20413

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2020
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. 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. Define Grotthus-Draper Law.
6. What is Photosensitization ?
7. What are alloys ?
8. What is condensed Phase rule ?
9. Mention the difference between a nanorod and a nanowire.
10. Write any two applications of carbon nanotubes.

PART – B **(5×16=80 Marks)**

11. a) i) Discuss cationic polymerisation mechanism in detail. **(8)**
    ii) Distinguish thermoplastics and thermosetting plastics. **(8)**

(OR)

b) i) Explain any four properties of polymers in detail. **(8)**
    ii) Discuss the preparation, properties and uses of Nylon 6.6. **(8)**

12. a) i) Derive Gibbs-Helmholtz equation and explain. **(8)**

ii) Compute free energy change when 5 moles of an ideal gas expands reversibly and Isothermally at 300 K from an initial volume of 50 L to 1000 L. **(8)**

(OR)

b) i) What meant by Vant Hoff's reaction isotherm ? Derive the expression for a reaction isotherm of the general reaction : $aA + bB \rightarrow cC + dD$. **(8)**

ii) Discuss the criteria for chemical reaction to be spontaneous. **(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 :

Inter System Crossing, Internal Conversion, Fluorescence and Phosphorescence. **(8)**

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

14. a) Explain the phase rule for water system. **(16)**

(OR)

b) Define the term with respect to alloys.

i) Annealing **(6)**

ii) Hardening. **(5)**

iii) Normalizing. **(5)**

15. a) i) What are the properties that change from its bulk form to nano size form ? Explain each with example. **(8)**

ii) Explain chemical vapour deposition technique of synthesis of nano particles. **(8)**

(OR)

b) i) Discuss the solvothermal and laser ablation methods of synthesis of nano materials. **(8)**

ii) Compare the properties of molecules, nanoparticles and bulk materials. **(8)**

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