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**B.E./B.TECH. DEGREE EXAMINATIONS, MAY/JUNE 2017**

**FIRST SEMESTER**

**(Common to All Branches Except MR)**

**CY16151 – ENGINEERING CHEMISTRY – I**

**(Regulation 2016)**

**Q. Code: 148654**

**Time: Three Hours**

**Maximum : 100 Marks**

Answer ALL questions

**PART A - (10 X 2 = 20 Marks)**

1. Define degree of polymerisation of a polymer?
2. Write the monomers of nylon and rubber.
3. What are the conditions for a thermodynamically spontaneous process?
4. Calculate the entropy change for the reversible expansion of 6 moles of an ideal gas when the volume change is 3 times of its original value.
5. Give any two examples for fluorescent substances.
6. Highlight the importance of is finger print region in IR spectroscopy.
7. Write the composition and significance of 18/8 stainless steel.
8. Mention the uses of phase rule.
9. Define CNT along with its types.
10. Why nanomaterials are good reaction catalysts?

**PART B - (5 X16 = 80 Marks)**

11. (a) (i) Differentiate thermoplastics and thermosetting plastics. (8)  
(ii) Explain the preparation, properties and uses of Nylon. (8)
- (OR)**
- (b) (i) Write the mechanism of addition polymerisation by free radical. (8)  
(ii) Explain in detail the solution polymerisation technique with two examples. (8)
12. (a) (i) Derive the relation  $\Delta G^0 = -RT \ln K_{eq}$  for a reversible chemical reaction. (8)

- (ii) The equilibrium constant for a reaction at  $500^{\circ}\text{C}$  and  $700^{\circ}\text{C}$  are  $1.64 \times 10^{-4}$  and  $0.64 \times 10^{-4}$  respectively. Calculate the enthalpy of the reaction assuming it to be a constant over the temperature range. (8)
- (OR)**
- (b) (i) Derive the relation between free energy change and the work obtained for a thermodynamic system. (8)
- (ii) Derive one form of Gibbs Helmholtz equation and mention its significance. (8)
13. (a) (i) Derive and explain Beer Lambert's law. (8)
- (ii) Explain the concept of fluorescence and phosphorescence using Jablonski diagram. (8)
- (OR)**
- (b) (i) Deduce the block diagram and instrumentation of UV spectroscopy. (8)
- (ii) Justify the mechanism of photosensitisation using photosynthesis. (8)
14. (a) (i) Explain the need for the preparation of alloys with suitable examples. (8)
- (ii) Draw the phase diagram of water system and explain in detail. (8)
- (OR)**
- (b) (i) Explain the phase diagram of Pb-Ag system and mention one of its applications. (8)
- (ii) Write informative notes on (i) Degree of freedom (8)  
(ii) Annealing
15. (a) (i) Differentiate bulk materials from nanomaterials. (8)
- (ii) Explain preparation of nanoparticles by hydrothermal and electrodeposition methods. (8)
- (OR)**
- (b) (i) Write about the important applications of nanomaterials in various industries. (8)
- (ii) How are CNT prepared by laser ablation and CVD? (8)