

10/11/13

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ANNA UNIVERSITY  
B.E / B.Tech. (FULL TIME) DEGREE SEMESTER EXAMINATIONS, NOV/DEC 2013  
Common to ALL Branches  
FIRST SEMESTER – (Regulations 2004/2008)  
CY171 Chemistry – I / CY9111 Engineering Chemistry

Time: 3 Hrs

Max. Marks: 100

Answer ALL Questions

PART - A

(10x2=20 Marks)

1. Calculate the entropy change when 4 moles of an ideal gas expands isothermally and reversibly from a volume of 8 litres to a volume of 24 litres. ( $R = 8.314 \text{ JK}^{-1}\text{mole}^{-1}$ )
2. Write Clausius and Kelvin statement.
3. State the phase rule and explain the terms involved in it.
4. Write short notes on eutectic point.
5. Give any two differences between physisorption and chemisorptions.
6. Define the term autocatalyst with suitable example.
7. Write down the general mechanism of bimolecular elimination ( $E_2$ ) reaction.
8. Mention any two applications of UV & visible spectroscopy.
9. What are nanoparticles? What are their characteristic properties?
10. Distinguish between nano rods and nano wires.

PART - B

(5x16=80 Marks)

11. (i) Derive Gibbs Helmholtz equation relating free energy and enthalpy. (8)  
(ii) Derive any two of the Maxwell relations. (8)
12. a) Draw the phase diagram of the single component sulphur system. Discuss the different phases existing and the transitions taking place in the system using the phase diagram. (16)

(OR)

12. b) (i) Draw a neat labeled phase diagram of water system and explain areas, curves and triple point in it. (8)
- (ii) With a neat phase diagram, explain the salient features of zinc-magnesium (Zn-Mg) alloy system. (8)
13. a) (i) Derive the expression for the rate of an enzyme catalyzed reaction. Comment on the effect of substrate concentration on the rate of the reaction. (16)

(OR)

- b) (i) State the postulates of Langmuir theory of adsorption. Derive Langmuir adsorption equation and explain the case of adsorption at low and high pressures. (8)
- (ii) Explain the preparation of adsorption column and separation of solutes by adsorption chromatography. (8)
14. a) (i) What are substitution reactions? Discuss the mechanism of unimolecular ( $S_N1$ ) and bimolecular ( $S_N2$ ) nucleophilic substitution reactions. (16)

(OR)

- b) (i) Explain the principle and basic components in IR spectrophotometer with a neat block diagram. (10)
- (ii) Draw a neat energy level diagram and show rotational, vibrational and electronic energy levels in it. (6)
15. a) (i) Give a brief account on the preparation, properties and applications of carbon nano tubes. (16)

(OR)

- b) (i) Discuss briefly the applications of nanochemistry in biology and medicine. (8)
- (ii) Derive an expression for van't Hoff isotherm for the following reversible reaction. (8)



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