

- (c) Why should a lubricant possess low carbon residue & high viscosity index? How VI of oil can be increased. Define viscous – static lubricants. [6]

Q-6. (a) Calculate the entropy change involved in the isothermal reversible expansion of 5 moles of an ideal gas from a volume of 10 litres to a volume of 100 litre at 300K. [4]

- (b) Calculate the entropy change when 10 KJ of heat flows from a body at a temperature of 327°C to a body at a temperature of 27°C when brought in contact with it. [4]

- (c) What is the principle of EDTA titration? What is the role of buffer in it?

0.28 g of CaCO₃ was dissolved in HCl and the solution was made upto 1 liter with distilled water. 100 ml of hard water sample required 33 ml of EDTA solution. After boiling 100 ml of this water, cooling filtering and titration, 10 ml of EDTA was required. Calculate temporary & permanent hardness. [12]

Q-7. (a) Explain mechanism of photosynthesis of HCl from H₂ and Cl₂ and photolysis of ammonia. [8]

- (b) Explain difference in between fluorescence and phosphorescence with the help of Jablonski diagram. [8]

- (c) Classify reactions with reference to their quantum efficiency with example. [4]

Q-8. (a) Give detailed description of C - terminal residue analysis of protein. [6]

- (b) Write a detailed note on structure of proteins. [8]

- (c) How will you classify lipids? Explain with example. [6]

Roll No.

Lingaya's University
B.Tech. 1st Year (Term – II)
Examination – Feb 2011
Applied Chemistry (CH - 101)

[Time: 3 Hours]

[Max. Marks: 100]

Before answering the question, candidate should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note: – Attempt five questions in all. All questions carry equal marks. Question no. 1 is compulsory. Select two questions from Section B and two questions from Section C.

Section – A

Q-1. Part – A

Select the correct answer of the following multiple choice questions. [10x1=10]

- (i) The entropy of the universe
(a) is increasing and tending towards a maximum value.
(b) is decreasing & tending towards zero
(c) remains constant
(d) is decreasing & increasing with periodic rate
- (ii) The entropy change for vaporization of liquid water to steam at 100°C is --- Jk⁻¹ mol⁻¹ Given that heat of vaporization is 40.8 kJ mol⁻¹
(a) 109.38 (b) 100.38 (c) 110.38 (d) 120.38
- (iii) In water system, the three phases exist in equilibrium at
(a) 0°C, 1 atm (b) .0075°C, 1 atm
(c) 0°C, 4.58 mm (d) .0075°C, 4.58 mm
- (iv) The intermetallic compound formed in Zn-Mg system is
(a) MgZn (b) Mg₂Zn (c) MgZn₂ (d) Mg₂ Zn₂

- (v) The alkaline hardness of water is due to the presence of the following salts of calcium and magnesium in water.
 (a) Bicarbonate only (b) HCO_3^- & CO_3^{2-} only
 (c) OH^- , CO_3^{2-} , HCO_3^- only (d) sulphate only
- (vi) The exhausted Zeolite can be regenerate by treated it with
 (a) 10% NaCl solution (b) 50% NaCl solution
 (c) 10% HCl solution (d) 50% HCl solution
- (vii) In differential aeration corrosion
 (a) poor oxygenated part act as anode
 (b) rich oxygenated part act as anode
 (c) poor oxygenated part act as cathode
 (d) metal as a whole act as cathode
- (viii) The shorter chain mineral oil possess
 (a) low viscosity (b) moderate viscosity
 (c) very high viscosity (d) no viscosity at all
- (ix) α - D glucose and β - D glucose are
 (a) epimers. (b) diastereomers
 (c) enantiomers (d) none of these
- (x) The formula to find out spin multiplicity is:
 (a) $2S-1$ (b) $2S+1$ (c) $2S-2$ (d) $2S+2$

Part – B

- (a) Describe the factors which cause alkalinity in water. What types of ions are present in water if
 (i) $P=0$, (ii) $P>\frac{1}{2}M$, (iii) $P<\frac{1}{2}M$ (iv) $P=M$
 [5]
- (b) 100 ml. of a water sample required 20 ml of N/50 H_2SO_4 for neutralization to phenolphthalein end point. After this methyl orange indicator was added to this and further acid required was again 20 ml. Calculate the alkalinity of water in terms of CaCO_3 in ppm. [5]

Section – B

- Q-2. (a) Draw and explain phase diagram of two component system with congruent melting point. [8]
 (b) Explain following terms with example.
 (i) Metastable equilibrium
 (ii) Eutectic point
 (iii) Chemical potential [3x3=9]
 (c) Eutectic is mixture or compound, give reasons in favour of your answer. [3]
- Q-3. (a) Derive Clapeyron-Clausius equation & write its application also.
 (b) Derive expressions describing the variation of free energy with temperature and pressure.
 Show that the decrease in free energy in a process occurring at constant temperature and pressure is a measure of maximum work done by the system. [2x10=20]
- Q-4. (a) Explain following properties of lubricants with their significance.
 (i) Aniline point (ii) Flash & Fire point
 (iii) Consistency of Grease [3x4=12]
 (b) Write various factors affecting corrosion. [8]

Section – C

- Q-5. (a) Explain the mechanism of hydrogen evolution and oxygen absorption in electrochemical corrosion with diagram. [8]
 (b) At what temperature will water boil when the atmosphere pressure is 528 mm Hg. Latent heat of vaporization of water is 545.5 Cal/g [6]