



# UNIVERSITY OF THE PUNJAB

**B.S. 4 Years Program : First Semester – 2020**

Paper: Chemistry-I (Physical Chemistry)

Course Code: CHEM-101/CHM-11020 Part-I (Compulsory) Time: 15Min. Marks: 10

Roll No. in Fig. ....

Roll No. in Words. ....

**Attempt this Paper on this Question Sheet only.**

**Division of marks is given in front of each question.**

**This Paper will be collected back after expiry of time limit mentioned above.**

.....  
Signature of Supdt.:

**Q.1. Encircle the right answer cutting and overwriting is not allowed. (10x1=10)**

(i) The measurement of depression in freezing point for determination of molar mass of given solute is called

(a) Chromatography (b) Cryoscopy (c) Ebullioscopy (d) None of these

(ii) The size of colloidal particles is determined by

(a) Brownian movement (b) Dynamic light scattering (c) Ultra-microscope (d) Tyndall effect

(iii) The molality is expressed in

(a)  $\text{kg mol}^{-1}$  (b)  $\text{kg mol}$  (c)  $\text{mol kg}^{-1}$  (d)  $\text{mol dm}^{-1}$

(iv) Liquid in liquid colloidal system is called

(a) Aero gel (b) emulsion (c) Sol (d) Gel

(v) Free energy change for spontaneous mixing of solute and solvent to form solution must be

(a) zero (b) +ve (c) -ve (d) maximum

- (vi) The depression in freezing point is directly proportional to  
(a) dilution of solution (b) volume of solvent (c) Mass of solvent (d) molality of solution
- (vii) The value of refractive index of aqueous solution of sucrose  
(a) Increases with concentration (b) Decreases with concentration  
(c) Does not change with concentration (d) None of these
- (viii) Solid in liquid colloidal solution is called  
(a) Sol (b) Gel (c) Emulsion (d) None of these
- (ix) The units of activation energy are  
(a)  $\text{J mol}^{-1}$  (b)  $\text{K kg mol}^{-2}$  (c)  $\text{K kg mol}$  (d)  $\text{K kg}^{-1} \text{ mol}$
- (x) Raoult's law is related to  
(a) Solvent effect (b) both magnetic and electric field (c) magnetic field  
(d) lowering of vapor pressure



**ATTEMPT THIS (SUBJECTIVE) ON THE SEPARATE ANSWER SHEET PROVIDED**

**Q.2. Give short answers of the following:**

**(10X2=20)**

- (a) Define the term Gibbs energy.
- (b) What is co-efficient of viscosity?
- (c) State 1st law of thermodynamics?
- (d) Give a mathematical relation between equilibrium constant and Gibbs energy.
- (e) Give SI units of surface tension.
- (f) Describe micellization.
- (g) What is critical micelle concentration?
- (h) What is difference between homogeneous and heterogeneous catalysis?
- (i) Give an application of refractive index measurement.
- (j) What is relation between entropy and probability?

Give brief answers of the followings.

(3x10=30)

- Q.3 (a) Define activation energy. Give its SI units. How it can be measured? (5)  
(b) Derive a relation between standard Gibbs energy and equilibrium constant. (5)
- Q.4 (a) What is order of reaction? Derive kinetic equation for zero order reaction. (5)  
(b) Briefly describe dialysis and electro-dialysis. (5)
- Q.5 (a) Discuss adiabatic process for ideal gases. (5)  
(b) Discuss the kinetics of enzyme catalysis. (5)