



UNIVERSITY OF THE PUNJAB

First Semester – 2019

Examination: B.S. 4 Years Program

Roll No. in Fig.

Roll No. in Words.

PAPER: Chemistry-I (Physical Chemistry)

MAX. TIME: 15 Min.

Course Code: CHEM-101/CHM-11020 Part-I (Compulsory)

MAX. MARKS: 10

Signature of Supdt.:

Attempt this Paper on this Question Sheet only.

Please encircle the correct option. Division of marks is given in front of each question.

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

Q.1. Encircle the right answer, cutting and overwriting is not allowed. (1x10=10)

Q1. Each question has four possible answers, encircle the right one. (1×10=10)

- (i) The colloidal solution is a
(a) Heterogeneous (b) homogeneous (c) True solution (d) None of these
- (ii) The units of 1st order rate constant are
(a) mmol⁻¹ (b) sec⁻¹ (c) m² mol⁻² (d) mol m⁻²
- (iii) The Units of Michaelis-Menten constant (K_M) are
(a) kg mol⁻¹ (b) kg mol (c) mol dm⁻³ (d) dm⁻³
- (iv) The entropy of universe is going to increase. This statement is called
(a) 1st law of thermodynamics (c) 2nd law of thermodynamics
(b) Zeroth law of thermodynamics (d) None of these
- (v) The Langmuir adsorption isotherm for adsorption of a gas on solid is $\theta = \frac{ap_A}{1+ap_A}$
It can be expressed as
(a) $p_A = \frac{\theta}{a(1-\theta)}$ (b) $p_A = \frac{\theta}{a(1+\theta)}$ (c) $p_A = \frac{a\theta}{(1+\theta)}$ (d) None of these
- (vi) The Freundlich adsorption isotherm $(x/m) = kp^{1/n}$ in term of equation of straight line in intercept form can be written as:
(a) $\log(x/m) = (1/n) \log p + \log k$ (b) $\log(x/m) = \log p + (1/n) \log k$
(b) $\log(x/m) = \log n + (1/k) \log p$ (d) $\log(x/m) = n \log p + (1/n) \log k$
- (vii) The SI units of pre-exponential factor A in equation $k = Ae^{-\frac{E_a}{RT}}$ for zero order reaction are
(a) MS⁻¹ (b) M⁻²S⁻¹ (c) M⁻¹S⁻¹ (d) None of these
- (viii) The phenomenon of scattering of light by colloidal particles is called
(a) Compton Effect (b) Doppler Effect (c) Electrophoresis effect (d) Tyndall Effect
- (ix) The units of molal freezing point constant (k_f) are
(a) K kg mol⁻¹ (b) K kg mol⁻² (c) K kg mol (d) K kg⁻¹ mol
- (x) The movement of colloidal particles under an applied electric potential is called
(a) Electrophoresis (b) Electro-osmosis (c) Cataphoresis (d) A and C



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PAPER: Chemistry-I (Physical Chemistry)

Course Code: CHEM-101 / CHM-11020 Part – II

MAX. TIME: 2 Hrs. 45 Min.

MAX. MARKS: 50

ATTEMPT THIS (SUBJECTIVE) ON THE SEPARATE ANSWER SHEET PROVIDED

Q. 2 Answers the following short questions: (2×10=20)

- (a) Define the term solution.
- (b) What is rate constant? Give units of 1st order rate constant.
- (c) What is surface tension? Has it any units?
- (d) Give a mathematical relation between standard Gibbs energy change, enthalpy change and entropy change.
- (e) What is adsorption?
- (f) Describe term colloids.
- (g) Write two properties of colloidal solution.
- (h) What is main difference between true solution and colloidal solution?
- (i) Give two applications of adsorption.
- (j) What do you understand by Gibbs energy?

Questions with brief answers

- Q.3 (a) Discuss heat capacities of gases. (5)
- (b) What is Maxwell's distribution law of molecular velocities? Derive an expression for the most probable velocity using Maxwell's distribution law. (5)
- Q.4 (a) Derive kinetic equation for zero order reaction. (5)
- (b) Briefly describe the purification of colloids. (5)
- Q.5 (a) What is adsorption isotherm? Discuss Freundlich's adsorption isotherm. (5)
- (b) Derive Clausius-Clapeyron equation to discuss the effect of temperature on vapor pressure. (5)