



UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Sixth Semester – 2019

Paper: Physical Chemistry

Course Code: CHEM-313 Part – I (Compulsory)

Time: 15 Min. Marks: 10

Roll No. in Fig.

Roll No. in Words.

Signature of Supdt.:

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.

Q.1. Encircle the correct choice.

(1x10=10)

(i) Mathematical relation between entropy and probability is

(a) $S = k_B \ln \omega$

(b) $S = -k_B \ln \omega$

(c) $S = -k_B \omega$

(d) None of these

(ii) 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) $\text{M}^{-1}\text{S}^{-1}$

(c) $\text{M}^{-2}\text{S}^{-1}$

(d) None of these

(iii) The pre-exponential factor A in equation $k = Ae^{-\frac{E_a}{RT}}$ is the rate constant at

(a) Room temperature

(b) Absolute zero

(c) Infinite temperature

(d) None of these

(iv) Eyring equation is related to

(a) Collision theory (b) Transition state theory (c) magnetic field

(d) Relaxation methods

P.T.O.

(v) The value of entropy of universe is going to increase. This statement belongs to

(a) 1st law of thermodynamics

(b) 2nd law of thermodynamics

(c) 3rd law of thermodynamics

(d) None of these

(vi) The relaxation methods are used to study the kinetics of

(a) Slow reactions

(b) Irreversible reactions

(c) Fast reversible reactions

(d) None of these

(vii) The SI units of $T\Delta S$ of a process are

(a) K mol^{-1} (b) J mol^{-1} (c) $\text{m}^2 \text{ mol}^{-2}$ (d) mol m^{-2}

(viii) In a reversible process entropy of the universe is always

(a) Increasing (b) Decreasing (c) Remains same (d) None of these

(ix) The units of rate constant for 1st order reaction are

(a) $\text{mol dm}^{-3} \text{Sec}^{-1}$ (b) K kg mol^{-2} (c) K kg mol (d) Sec^{-1}

(x) The method of kinetic study of fast reaction based on perturbation of a system in equilibrium are called

(a) Relaxation methods (b) Phosphorescence methods

(c) Transmission methods (d) Spectroscopic methods



ATTEMPT THIS (SUBJECTIVE) ON THE SEPARATE ANSWER SHEET PROVIDED

- Q. 2 Answers the following short questions: (2×10=20)
- (a) Define the term microstate.
 - (b) What are effective collisions?
 - (c) Give two statements of 2nd law of thermodynamics.
 - (d) Give a mathematical relation between Gibbs energy, entropy and enthalpy of a process.
 - (e) What is the effect of temperature on vertical distribution of gas?
 - (f) Describe term Clausius in-equality.
 - (g) Write two different forms of Arrhenius equation.
 - (h) What is difference between Classical and Statistical thermodynamics?
 - (i) Give mathematical formulation of Barometric formula.
 - (j) What do you understand by fast reactions?
- Q.3 (a) State and explain 2nd law of Thermodynamics. (5)
(b) Discuss Clausius in-equality in Thermodynamics. (5)
- Q.4 (a) Give five postulates of transition state theory. (5)
(b) Derive Eyring equation on the basis of postulates of transition state theory (5)
- Q.5 (a) What is Sterling's approximation? Give its significance. (5)
(b) Discuss effect of molar mass and altitude on vertical distribution of particles. (5)