



A Charutar Vidya Mandal's Institution
V.P. & R.P.T.P. SCIENCE COLLEGE

(AUTONOMOUS) (Grant-in-Aid)

Affiliated to Sardar Patel University

VALLABH VIDYANAGAR-388120



Bachelor of Science (Semester 6) Internal Examination - 2026

COURSE CODE: (US06MACHE02)

PHYSICAL CHEMISTRY

Dt:07.03.2026, Saturday

Time: 10:45 AM – 12:15 PM

Marks: 30

Q-1	Choose the most appropriate option out of four provided to you.	(06)
(i)	Entropy change in isothermal expansion of ideal gas is: (a) Zero (b) $nR \ln(V_2/V_1)$ (c) $nR(T_2/T_1)$ (d) $C_p \ln(T_2/T_1)$	
(ii)	Free energy change with temperature is given by: (a) $dG/dT = -S$ (b) $dG/dT = S$ (c) $dG/dT = H$ (d) $dG/dT = 0$	
(iii)	The temperature co-efficient of the reaction may be expressed as the ratio of two _____. (a) equilibrium constant (b) rate constant (c) 'a' and 'b' both (d) none of these	
(iv)	Which of the following diagram is plotted for two component system at constant pressure? (a) Pressure-Temperature diagram (b) Composition-Pressure diagram (c) Temperature- Composition diagram (d) All of these	
(v)	The maximum number of phases in any equilibrium state of one component system having zero degree of freedom will be _____. (a) 1 (b) 2 (c) 3 (d) 4	
(vi)	Which of the following is an amalgam electrode? (a) Zn/Zn^{2+} (b) $Pt/H_2/H^+$ (c) Na/Hg (d) Ag/Ag^+	
Q-2	What is cyclic process? Discuss Carnot cycle.	(06)
	OR	
Q-2	Prove that decrease in the function 'A' gives the maximum work that can be done by the system during the given change.	(06)
Q-3	Explain equilibrium approximation and steady-state approximation.	(06)
	OR	
Q-3	Derive Eyring equation for unimolecular reactions.	(06)
Q-4	Draw and discuss the phase diagram of water system.	(06)
	OR	
Q-4	Discuss various methods for the experimental determination of transition point.	(06)
Q-5	How equilibrium constant and solubility product can be deduced from the emf measurement? Explain using suitable example of electrochemical cell.	(06)
	OR	
Q-5	Define different types of concentration cell giving suitable example. Also for the following cell, write the cell reaction and calculate the emf of the cell. Cell: $Cu/Cu^{+2}(a_1=0.01)//Cu^{+2}(a_2=0.05)/Cu$.	(06)

Seat no. _____

Supervisor's sign _____



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QUIZ TEST

Dt:07.03.2026,Saturday

Time:20 minutes

Marks:15

Q-1	Mark the statements as TRUE or FALSE and fill in the blanks.	(15)
1	The first law of thermodynamics fails to explain _____ (a) energy conservation (b) direction of heat flow	
2	For reversible process _____ (a) entropy production is zero (b) entropy decreases	
3	The correct Arrhenius equation is, _____ (a) $k = A \cdot e^{-E_a/RT}$ (b) $k = A \cdot e^{E_a/RT}$	
4	_____ are called Arrhenius parameters. (a) E_a and A (b) E_a and T	
5	A phase is always _____ (a) homogeneous (b) heterogeneous	
6	The correct phase rule equation is _____ (a) $F = C - P + 2$ (b) $F = C - P - 2$	
7	For the half cell reaction: $O_{2(g)} + 2H_2O + 4e^- \rightarrow 4OH^-_{(aq)}$, $-\Delta G^0/FE^0 =$ _____. (a) 2 (b) 4	
8	The effective concentration of an ion or the electrolyte in a solution is called _____. (a) molality (b) molarity <i>activity</i>	
9	In a cyclic process, the net change in internal energy is maximum. (TRUE or FALSE)	
10	For ideal gas, entropy increases with increase in volume. (TRUE or FALSE)	
11	The reaction coordinates, which has maximum potential energy is known as a simple complex. (TRUE or FALSE)	
12	The Arrhenius pre- exponential factor (A) is also known as a frequency factor. (TRUE or FALSE)	
13	The temperature corresponding to the eutectic point is called the eutectic temperature. (TRUE or FALSE)	
14	Sulphur exists in five different phases. (TRUE or FALSE)	
15	The electrochemical cell is that in which chemical energy is converted to thermal energy	