



Q1. The reaction A giving A* has activation energy E_1 and rate constant k_1 . The product further decomposes to B with activation energy E_2 and rate constant k_2 . If for the overall reaction A giving B, the rate constant k is related to the individual rate constant as $k = \sqrt{k_1 k_2}$ and E is the overall activation energy then,

- (1) $E = E_1 + E_2$
- (2) $E = (E_1 + E_2)/2$
- (3) $E = \sqrt{E_1 E_2}$
- (4) None of these

Q2. For a zero order reaction

- (1) Activation energy is zero
- (2) Heat of reaction is zero
- (3) Rate of disappearance is zero
- (4) Rate of disappearance of a reactant is independent of concentration

Q3. A first order reaction is 90% complete in 90 minutes. Hence it is 50% complete in approximately:

- (1) 50 min
- (2) 54 min
- (3) 27 min
- (4) 62 min

Q4. The rate constants of a reaction are $10^5/s$ and $10^7/s$ at $50^\circ C$ and $100^\circ C$ respectively. then the activation energy is:

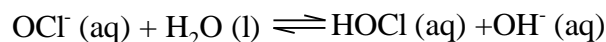
- (1) 92kJ
- (2) 97 kJ
- (3) 92.25kJ
- (4) None of these

Q5. Half lives of first order and zeroth order reactions are same, Ratio of rates at the start of reaction is: (assume same initial concentration)

- (1) .693
- (2) $1/0.693$
- (3) 1.386

(4) $2/.693$

Q6. The equilibrium constant for the reaction



is 3.6×10^{-7} ; K_a for HOCl is:

- (1) 2.6×10^{-8}
- (2) 3.6×10^{-7}
- (3) 6×10^{-7}
- (4) 1.6×10^{-7}

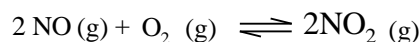
Q7. For the equilibrium in a closed vessel



K_p is found to be double of K_c at (unit of K_p is atm)

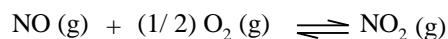
- (1) $T = 2 \text{ K}$
- (2) $T = 12.18 \text{ K}$
- (3) $T = 24.36 \text{ K}$
- (4) $T = 27.3 \text{ K}$

Q8. For the elementary gas phase reaction



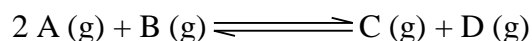
Rate for the forward reaction = $2.6 \times 10^3 [\text{NO}]^2 [\text{O}_2]^1$. The rate for the reverse reaction at $380^\circ C$ is

Rate = $4.1 [\text{NO}_2]^2$. Hence the equilibrium constant for the formation of NO by the chemical equation



- (1) 6.34×10^2
- (2) 1.577×10^{-3}
- (3) 25.28
- (4) 3.97×10^{-2}

Q9. Consider the following gas phase reaction



$\Delta H^0 = \text{positive}$, which of the following affects neither the composition nor the value of K_c ?

- (1) Addition of reactants
- (2) Addition of helium at constant pressure
- (3) Addition of catalyst
- (4) Increase of temperature

Q10. Select the correct statement from among the followings

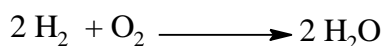
- (a) There can be no change in the concentration of the reactants and products at equilibrium
- (b) Chemical equilibrium is dynamic in nature
- (c) Equilibrium can be affected only by change in temperature.
- (d) Catalyst can alter the state of equilibrium

- (1) Only (b)
- (2) Only (c)
- (3) Only (a), (b) and (c)
- (4) All (a),(b), (c), (d)

Q11. Which of the following represents variation of equilibrium constant with temperature ?

- (1) $\ln K_{eq} = \text{constant} - \frac{\Delta H}{RT}$
- (2) $\log K_{eq} = \text{constant} - \frac{\Delta H}{RT}$
- (3) $\frac{d \log K_{eq}}{dT} = \frac{-\Delta H}{RT^2}$
- (4) none of these

Q12. For the fuel cell reaction :

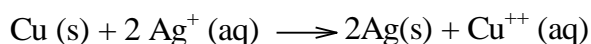


$\Delta G^0 = -475 \text{kJ}$, hence E_{cell}^0 is

- (1) 1.23 V
- (2) 2.46 V
- (3) .615 V
- (4) .31 V

Q13. For the following cell reaction, E_{cell}^0 is 0.46 V

at 300K and .48 V at 310 K, the entropy change is



- (1) 193 J/K
- (2) 386 J/K
- (3) 579 J/K
- (4) -193 J/K

Q14. The temperature coefficient of the emf of the cell in the reaction in Q13 is :

- (1) 0.02 V/K
- (2) .2 V/K
- (3) .002 V/K
- (4) 2 V/K

Q15. Temperature coefficient of the emf of the cell in terms of entropy change is

- (1) $\frac{\Delta S}{nF}$
- (2) $\frac{\Delta S}{T}$
- (3) $-\frac{\Delta S}{nF}$
- (4) $\frac{\Delta S}{n}$

Q16. Select the correct statement :

- (1) In electrolytic cell, electrode at which oxidation takes place is anode and is positive plate
- (2) In electrochemical cell, electrode at which oxidation takes place is anode and is negative plate
- (3) Both are correct
- (4) None is correct

Q17. How many coulombs are required for the oxidation of 1 mol water to oxygen ?

- (1) $3.86 \times 10^5 \text{ C}$
- (2) $9.65 \times 10^4 \text{ C}$
- (3) $1.93 \times 10^5 \text{ C}$
- (4) $4.825 \times 10^4 \text{ C}$

Q18. When fused alumina is electrolysed, aluminium is produced at one electrode and

<p>oxygen gas at the other electrode. For a given quantity of electricity, ratio of number of moles of aluminium to the number of moles of oxygen gas produced is :</p> <p>(1) 1: 1 (2) 2 :1 (3) 2 :3 (4) 4: 3</p> <p>Q19. What is the no of gram electrons entering an electrolytic cell when a current of 1A is passed for 16 seconds :</p> <p>(1) 10^{20} (2) 10^{21} (3) 10^{22} (4) 10^{18}</p> <p>Q20. Cell constant is maximum in the case of a :</p> <p>(1) Wire of length 100 cm and area 100 cm^2 (2) Wire of length 10 cm and area 10 cm^2 (3) One centimetre cube of a material (4) Equal in all cases</p> <p>Q21. which of the following are not surface phenomena ?</p> <p>(1) Viscosity and surface tension (2) Adsorption and surface tension (3) Absorption and viscosity (4) Adsorption and viscosity</p> <p>Q22. The stabilisation of a dispersed phase in a lyophobic colloid is due to :</p> <p>(1) The adsorption of charged substance on dispersed phase (2) The large electro-kinetic potential developed in the colloid (3) The formation of an electrical layer between two phases (4) The viscosity of the medium</p> <p>Q23. The rate of chemisorption</p> <p>(1) Decreases with increase of pressure (2) Increases with increase of pressure</p>	<p>(3) Is independent of pressure (4) is independent of temperature</p> <p>Q24. polling process :</p> <p>(1) Reduces SnO_2 to Sn (2) Oxidises impurities like iron and removes as scum (3) Uses green poles (4) All of the above are correct</p> <p>Q25. Magistral is burnt pyrites containing :</p> <p>(1) Sulphates of iron and copper (2) Sulphates and oxides of iron and copper (3) Oxides of iron and copper (4) Sulphides of silver and lead</p> <p>Q26. At a given temperature, total vapour pressure in Torr of a mixture of volatile components A and B is given by $P = 120 - 75X_A$, hence vapour pressure of pure A and B respectively are (in Torr) : (X_A is the mole fraction of A in solution phase)</p> <p>(1) 120 , 75 (2) 120 , 195 (3) 45, 120 (4) 75, 45</p> <p>Q27. Total vapour pressure of a mixture of 1 mol of volatile component A ($P_A^0 = 100 \text{ mm of Hg}$) and 3 mol of volatile component B ($P_B^0 = 60 \text{ mm of Hg}$) is 75 mm . For such case :</p> <p>(1) There is positive deviation from Raoult's law (2) Boiling point has been lowered (3) Force of attraction between A and B is smaller than that between A and A and between B and B (4) All the above statements are correct</p> <p>Q28. Vapour pressure of pure water is 40 mm of Hg. If a non-volatile solute is added to it, vapour pressure falls by 4 mm . hence the molality of solution (at the same temperature) is :</p> <p>(1) 6.173</p>
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(2) 3.0864

(3) 1.543

(4) .722

Q29. A colligative property of a solution depends on the

- (1) arrangement of atoms in solute molecule
- (2) total number of molecules of solute and solvent
- (3) number of molecules of solute in solution
- (4) mass of the solute molecules

Q30. Select the correct statement :

- (1) Osmosis ,like all colligative properties ,results from an increase in entropy as pure solvent passes through the membrane and mixes with the solution
- (2) desalination of sea water is done by reverse osmosis
- (3) both are correct
- (4) none is correct