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 zeorth order reaction :

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

Q3. A reaction of first –order 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 $50^0$C and $100^0$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 concentrations )

(1) .693
(2) 1 /0.693
(3) 1.386
(4) 2/ .693

Q6. The equilibrium constant for the reaction

$$OCl^-(aq) + H_2O(l) \rightleftharpoons HOCl(aq) + OH^-(aq)$$

*is* $3.6 \times 10^{-7}$ ;hence $K_a$ for HOCl is :

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

Q7. For the equilibrium in a closed vessel

$$PCl_5(g) \rightleftharpoons PCl_3(g) + Cl_2(g)$$

$K_p$ is found to be double of $K_C$ . this is attained when :

(1) T = 2 K
(2) T = 12.18 K
(3) T = 24. 36 K
(4) T = 27.3 K

Q8. For the elementary gas phase reaction

$$2NO + O_2 \rightleftharpoons 2NO_2$$

Rate = $2.6 \times 10^3 [NO]^2 [O_2]^1$ . The rate for the reverse reaction at 380 $^0$C is given by

Rate = 4.1 $[NO_2]^2$ . Hence the equilibrium constant for the formation of NO by the chemical equation

$$NO + (1/2)\, O_2 \longrightarrow NO_2$$

(1) $6.34 \times 10^2$
(2) $1.577 \times 10^{-3}$
(3) 25.28
(4) $3.97 \times 10^{-2}$

Q9. Consider the following gas phase reaction

$$2A(g) + B(g) \rightleftharpoons C(g) + D(g)$$

$\Delta H^0 = +ve$ , 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 statements from among the followings

(a) There can be no change in the concentration of the reactants and products at equilibrium
(b) Chemical equilibrium is dynamics
(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 represents variation of equilibrium constant with temperature ?

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

Q12. For the fuel cell reaction :

$$2\ H_2 + O_2 \longrightarrow 2\ H_2O$$

$\Delta G^0 = -475kJ$ ,hence $E^0_{cell}$ ?

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

Q13. For the following cell reaction , $E^0_{cell}$ is 0.46 V

Change is :

$$Cu\ (s) + 2\ Ag^+\ (aq) \longrightarrow 2Ag(s) + Cu^{++}\ (aq)$$

(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 above question 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 coloumbs are required for the oxidation of 1 mol water to oxygen ?

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

Q18. When alumina is electrolysed ,aluminium is produced at one electrode and oxygen gas at the

at 300K and .48 V at 310 K , hence the entropy

Other electrode. For a given quantity of electricity ,ratio of number of moles of aluminium to the number of moles of oxygen gas is :

(1) 1: 1
(2) 2 :1
(3) 2 :3
(4) 4: 3

Q19. 96500 coloumbs deposits 107.9 g of silver. If electronic charge is $1.6 \times 10^{-19}\ C$, then the value of Avogardro's number is :

(1) $6.023 \times 10^{-23}\ per\ mol$
(2) $6.023 \times 10^{23}\ per\ mol$
(3) $6.023 \times 10^{19}\ per\ mol$
(4) $6.023 \times 10^{-19}\ per\ mol$

Q20. Cell constant is maximum in case of a :

(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

Q21.which are not purely surface phenomena ?

(1) Viscosity and surface tension
(2) Adsorption and surface tension
(3) Absorption and viscosity
(4) Adsorption and viscosity

Q22. The stabilisation of a dispersed phase in a lyophobic colloid is due to :

(1) The adsorption of charged substance on dispersed phase
(2) The large electo-kinetitc potential developed in the colloid
(3) The formation of an electrical layer between two phases
(4) The viscosity of the medium

Q23. The rate ofchemisorption :

(1) Decreases with increase of pressure
(2) Increases with increase of pressure

Q24.polling process :

(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

Q25. Magistral is the burnt pyrites containing :

(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

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) :

(1) 120 , 75
(2) 120 , 195
(3) 45, 120
(4) 75, 45

Q27. Total vapour pressure of a mixture of 1 mol of volatile component A ($P_A^0 = 100\ mm\ of\ Hg$) and 3 mol of volatile component V($P_B^0 = 60\ mm\ of\ Hg$ is 75 mm . for such case :

(1) There is positive deviation from Raoults 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

Q28. Vapour pressure of pure water is 40 mm of Hg. If a non –volatile solutes is added to it,vapour pressure falls by 4 mm . hence the molality of solution is :

(1) 6.173
(2) 3.0864
(3) 1.543
(4) .722

(3) Is independent of pressure
(4) is independent of temperature

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

| | |
|---|---|
| | (5) |