

PHYSICAL CHEMISTRY ONE MARK TEST

50X1=50

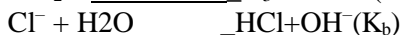
- In the Schottky defect
 - Cations are missing
 - Anions are missing
 - Equal number of cations and anions are missing
 - Equal number of extra cations and anions are present in the interstitial sites
- For a first-order reaction, the half-life period is independent of:
 - Initial concentration
 - Cube root of initial concentration
 - Final concentration
 - Square root of final concentration
- Find the pH of a 0.1 M ammonium formate solution assuming complete dissociation. (pK_a of formic acid = 3.8 and pK_b of NH₃ = 4.8.)
 - 6.5
 - 7.5
 - 5.5
 - 5.6
- The electrical conductivity of the following aqueous solutions is highest for:
 - 0.1 M CH₃COOH
 - 0.1 M CH₂F₂COOH
 - 0.1 M CHF₂COOH
 - 0.1 M CH₂ClCOOH
- In the reaction $\text{H}_2\text{O}_{2(aq)} \xrightarrow{\text{I}^-_{(aq)}} \text{H}_2\text{O}_{(l)} + \text{O}_{2(g)}$ iodide ion acts as
 - homogeneous catalyst
 - acid catalyst
 - heterogeneous catalyst
 - enzyme catalyst
- The largest void is
 - Octahedral void
 - Tetrahedral void
 - Triangular void
 - All are equal
- The first-order rate constant for the decomposition of N₂O₅ is $6.2 \times 10^{-4} \text{ s}^{-1}$. The half-life for this decomposition is:
 - 1177.7 s
 - 1117.7 s
 - 6.077 s
 - 110.77 s
- The conjugate base of OH⁻ is:
 - H₂O
 - O²⁻
 - O
 - O₂
- The equivalent weight of Na₂S₂O₃ in the reaction $2\text{Na}_2\text{S}_2\text{O}_3 + \text{I}_2 \rightarrow \text{Na}_2\text{S}_4\text{O}_6 + 2\text{NaI}$ (M = molecular weight):
 - M
 - M/4
 - M/0.5
 - M/2
- In Freundlich adsorption isotherm, the value of 1/n is
 - between 0 and 1 in all cases
 - between 2 and 4 in all cases
 - 1 in case of physical absorption
 - 1 in case of chemisorptions
- The efficiency of packing in simple cube unit cell is
 - $\frac{\pi}{6}$
 - $\frac{\sqrt{3}\pi}{8}$
 - $\frac{\sqrt{2}\pi}{6}$
 - $\frac{\pi}{16}$
- If the rate of the reaction is equal to the rate constant, the order of the reaction is:
 - 3
 - 0
 - 1
 - 2
- One of the following species acts as both Brønsted acid and base:
 - H₃PO₃
 - H₃PO₄
 - HPO₄²⁻
 - All of the above
- In an aqueous solution, hydrogen will not reduce:
 - Ag⁺
 - Cu²⁺
 - Zn²⁺
 - Fe³⁺
- Which property of colloidal solution is independent of charge on the colloidal particles?
 - Electroosmosis
 - Tyndall effect
 - Coagulation
 - Electrophoresis
- The edge length of the unit cell of NaCl crystal lattice is 552 pm. If the ionic radius of sodium ion is 95 pm. What is the ionic radius of chloride ion?
 - 181 pm
 - 190 pm
 - 276 pm
 - 368 pm
- Units of rate constant for the first and zero-order reactions in terms of molarity M, units are respectively:
 - s⁻¹, Ms⁻¹
 - s⁻¹, M
 - M s⁻¹, s⁻¹
 - M, s⁻¹
- The pH of 10⁻¹⁰ M HCl is:
 - 3
 - 4
 - 2
 - 1
- Which of the following is not correct?
 - Aqueous solution of NaCl is an electrolyte
 - The units of electrochemical equivalent are g. coulomb
 - In the Nernst equation, 'n' represents the number of electrons transferred in the electrode reaction
 - Standard reduction potential of hydrogen electrode is zero volts
- Physical adsorption is inversely proportional to:

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- (a) Temperature (b) Volume (c) Concentration (d) All of these
21. In face-centered cubic unit cell, edge length is:
(a) $2r$ (b) $(4/\sqrt{2})r$ (c) $(4/\sqrt{3})r$ (d) $(\sqrt{3}/2)r$
22. The molecularity of a reaction is:
(a) Always two (b) Same as its order
(c) Different as its order (d) May be same or different as compared to order

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23. For the reactions given below the correct relations is: HCl



- (a) $K_b = K_a$ (b) $K_w = K_a \cdot K_b$ (c) $K_a/K_b = K_w$ (d) $K_b = 1/K_a$

24. When a copper wire is placed in a solution of AgNO_3 , the solution acquires blue colour. This is due to the formation of:

- (a) Cu^+ ions (b) Cu^{2+} ions
(c) Soluble complex of copper with AgNO_3 (d) Cu^+ ion by the reduction of Cu

25. The diameter of colloidal particles ranges from:

- (a) 10^{-9} m to 10^{-6} m (b) 10^{-6} m to 10^{-3} m (c) 10^{-12} m to 10^{-9} m (d) 10^{-3} m to 10^{-6} m

26. The defect when an anion occupies an interstitial position in the crystal lattice is called:

- (a) Schottky defect (b) Crystal defect (c) Frenkel defect (d) None of these

27. For a chemical reaction, which can never be a fractional number?

- (a) Order (b) Half-life (c) Molecularity (d) Rate constant

28. Which among the following acts as a basic buffer solution?

- (a) $\text{NH}_4\text{Cl} + \text{NH}_4\text{OH}$ (b) $\text{NaCl} + \text{NaOH}$ (c) $\text{NH}_4\text{Cl} + \text{CH}_3\text{COOH}$ (d) $\text{CH}_3\text{COONa} + \text{CH}_3\text{COOH}$

29. The Nernst equation, $E = E^\circ - (RT/nF) \ln Q$ indicates that the equilibrium constant K_c will be equal to Q when:

- (a) $E = \text{zero}$ (b) $E^\circ = 1$ (c) $E = E^\circ$ (d) $RT/nF = 1$

30. Which of the following is not related to colloids:

- (a) Ultrafiltration (b) Dialysis (c) Brownian movement (d) Wavelength

31. The density of the crystal (ρ) is given by the formula:

- (a) $\frac{3N_A}{nM}$ (b) $\frac{nM \cdot a^3}{N_A}$ (c) $\frac{N_A M}{n a^3}$ (d) None of these

32. Rate constant of a reaction (k) is $175 \text{ L}^2 \text{ mol}^{-2} \text{ sec}^{-1}$. What is the order of reaction?

- (a) First (b) Second (c) Third (d) Zero

33. Which has highest pH?

- (a) CH_3COOK (b) Na_2CO_3 (c) NH_4Cl (d) NaNO_3

34. A certain current liberates 0.504 g of hydrogen in 2 hours. The amount (or mass) of copper deposited at the cathode during the electrolysis of $\text{CuSO}_4(\text{aq})$ solution by the same current flowing for the same time is (atomic masses $\text{H} = 1.0$, $\text{Cu} = 63.5$):

- (a) 16.0g (b) 32.0g (c) 8.6g (d) 1.60g

35. The movement of colloidal particle under the influence of electric field is called:

- (a) Electrodialysis (b) Electroosmosis (c) Electrolysis (d) Electrophoresis

36. If edge lengths a, b, c are unequal and angles α, β, γ are unequal and not 90° , it represents a:

- (a) Triclinic system (b) Tetragonal (c) Monoclinic (d) Orthorhombic

37. For the reaction, $\text{NO} \xrightarrow{25} 2\text{NO} + \frac{1}{2}\text{O}_2$. Given values are $-\frac{d[\text{NO}]}{dt} = K_1[\text{NO}]$; $-\frac{d[\text{NO}_2]}{dt} = K_2[\text{NO}]$; $\frac{d[\text{O}_2]}{dt} = K_3[\text{NO}]$. Now the relation in between K_1, K_2 and K_3 is:

- (a) $K_1 = K_2 = K_3$ (b) $3K_1 = K_2 = 2K_3$ (c) $2K_1 = 4K_2 = K_3$ (d) $2K_1 = K_2 = 4K_3$

38. The dissociation constant of a weak acid is 4.9×10^{-8} , its percentage ionization at 0.1 M is:

- (a) 0.07% (b) 0.007% (c) 0.7% (d) 0.0007%

39. Limiting molar conductivity of NH_4OH [i.e., $\Lambda^\circ m(\text{NH}_4\text{OH})$] is equal to

- (a) $\Lambda^\circ m(\text{NH}_4\text{Cl}) + \Lambda^\circ m(\text{NaCl}) - \Lambda^\circ m(\text{NaOH})$ (b) $\Lambda^\circ m(\text{NaOH}) + \Lambda^\circ m(\text{NaCl}) - \Lambda^\circ m(\text{NH}_4\text{Cl})$
(c) $\Lambda^\circ m(\text{NH}_4\text{OH}) + \Lambda^\circ m(\text{NH}_4\text{Cl}) - \Lambda^\circ m(\text{HCl})$ (d) $\Lambda^\circ m(\text{NH}_4\text{Cl}) + \Lambda^\circ m(\text{NaOH}) - \Lambda^\circ m(\text{NaCl})$

40. Colloidal solution of silver is prepared by:

- (a) Bredig's arc method (b) Peptization (c) Oxidation (d) Double decomposition

41. Which of the following is a molecular solid?

- (a) glucose (b) naphthalene (c) solid NH_3 (d) All of these

42. The time taken for the completion of 90% of a first-order reaction is 't' min. What is the time (in seconds) taken for the completion of 99% of the reaction?

- (a) 2t (b) t/30 (c) 120t (d) 60t

43. The $\text{p}K_a$ of a weak acid is 4.8. What should be the ratio of [acid]/[salt], if a buffer of $\text{pH} = 5.8$ is required?

- (a) 0.1 (b) 10 (c) 1 (d) 2
44. During electrolysis of a solution of AgNO_3 , 9650 coulombs of charge pass through the electroplating bath, the mass of silver deposited on the cathode will be:
- (a) 1.08g (b) 10.8g (c) 21.6g (d) 108g
45. Which of the following kinds of catalysis can be explained by the adsorption theory:
- (a) Enzyme catalysis (b) Homogeneous catalysis (c) Acid base catalysis (d) Heterogeneous catalysis
46. Which of the following is not a characteristic of amorphous solids?

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- (a) Have sharp melting point
(c) Show isotropy
- (b) Have non-orderly or very short-range orderly arrangement
(d) Have tendency to undergo irregular cleavage
47. If the rate constant for a first order reaction is k , the time (t) required for the completion of 99% of the reaction is given by
 (a) $t = 2.303/k$ (b) $t = 0.693/k$ (c) $t = 6.909/k$ (d) $t = 4.606/k$
48. The solubility product of BaCl_2 is 4×10^{-9} . Its solubility in mol L^{-1} is:
 (a) 4×10^{-3} (b) 4×10^{-9} (c) 1×10^{-3} (d) 1×10^{-9}
49. In the lead-storage battery during charging, the cathode reaction is
 (a) formation of PbO_2 (b) formation of PbSO_4
 (c) reduction of Pb^{2+} to Pb (d) none of these
50. Which one of the following reactions is an example of heterogeneous catalysis:
- (a) $2\text{CO}_{(g)} + \text{O}_{2(g)} \xrightarrow[\text{Pt}_{(s)}]{\text{NO}_{(g)}} 2\text{CO}_2$
 (b) $2\text{SO}_{2(g)} + \text{O}_{2(g)} \xrightarrow[\text{I}_{2(g)}]{\text{NO}_{(g)}} 2\text{SO}_{3(g)}$
 (c) $2\text{CO}_{(g)} + \text{O}_{2(g)} \xrightarrow{\quad} 2\text{CO}_{2(g)}$
 (d) $\text{CH}_3\text{CHO}_{(g)} \xrightarrow{\quad} \text{CH}_4 + \text{CO}_{(g)}$