Test / Exam Name: Mcqs Test Chapter 1 2 3 4 Standard: 12th Science Subject: Chemistry

Instructions

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Q1. In the Arrhenius equation, when log k is plotted against 1/T, a straight line is obtained whose: **1 Mark**

A slope is $\frac{A}{R}$ and intercept is E_a.

B slope is A and intercept is $\frac{-E_a}{R}$

C slope is $\frac{-E_a}{RT}$ and intercept is log A.

D slope is $\frac{-E_a}{2{:}303\ R}$ and intercept is log A.

Q2. $\triangle G$ and E°_{cell} for a spontaneous reaction will be: **1 Mark**

A Positive, negative **B** Negative, negative **C** Negative, positive **D** Positive, positive

Q3. An electrochemical cell behaves like an electrolytic cell when:

A $E_{cell} = E_{external}$. **B** $E_{cell} = 0$. **C** $E_{external} > E_{cell}$. **D** $E_{external} < E_{cell}$.

Q4. Two statements are given- one labelled Assertion (A) and the other labelled Reason (R). Select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below:
Assertion (A): Non-ideal solutions form azeotropic mixture.
Reason (R): Maximum boiling azeotropes are formed by a solution showing negative deviation.

A Both Assertion (A) and Reason (R) are correct statements, and Reason (R) is the correct explanation of the Assertion (A).

B Both Assertion (A) and Reason (R) are correct statements, but Reason (R) is not the correct explanation of the Assertion (A).

C Assertion (A) is correct, but Reason (R) is incorrect statement.

D Assertion (A) is correct, but Reason (R) is incorrect statement.

Q5. In a lead storage battery:

A PbO_2 is reduced to $PbSO_4$ at the cathode.

B Pb is oxidised to $PbSO_4$ at the anode.

C Both electrodes are immersed in the same aqueous solution of H_2SO_4.

D All the above are true.

Q6. **Assertion (A):** Transition metals have high melting point.
Reason (R): Transition metals have completely filled d-orbitals.

A Both Assertion (A) and Reason (R) are correct statements, and Reason (R) is the correct explanation of the Assertion (A).

B Both Assertion (A) and Reason (R) are correct statements, but Reason (R) is not the correct explanation of the Assertion (A).

C Assertion (A) is correct, but Reason (R) is wrong statement.

D Assertion (A) is wrong, but Reason (R) is correct statement.

Q7. Which of the following is correct for spontaneity of a cell? **1 Mark**

A $\Delta G = -\text{ve}\ E^0 = +\text{ve}$

B $\Delta G = +\text{ve}\ E^0 = 0$

C $\Delta G = -\text{ve}\ E^0 = 0$

D $\Delta G = +\text{ve}\ E^0 = -\text{ve}$

Q8. Which one of the following first row transition elements is expected to have the highest third ionization enthalpy? **1 Mark**

A Iron (Z = 26) **B** Manganese (Z = 25) **C** Chromium (Z = 24) **D** Vanadium (Z = 23)

Q9. **Assertion (A):** Conductivity of an electrolyte increases with decrease in concentration. **1 Mark**
Reason (R): Number of ions per unit volume decreases on dilution.

A Both Assertion (A) and Reason (R) are correct statements, and Reason (R) is the correct explanation of the Assertion (A).
B Both Assertion (A) and Reason (R) are correct statements, but Reason (R) is not the correct explanation of the Assertion (A).
C Assertion (A) is correct, but Reason (R) is wrong statement.
D Assertion (A) is wrong, but Reason (R) is correct statement.

Q10. The slope in the plot of ln [R] Vs. time gives. **1 Mark**

A $+k$
B $\frac{+k}{2.303}$
C $-k$
D $\frac{-k}{2.303}$

Q11. Racemisation occurs in: **1 Mark**

A S_N2 reaction.
B S_N1 reaction.
C Neither S_N2 nor S_N1 reactions.
D SN2 reaction as well as S_N1 reaction.

Q12. A first order reaction takes 30 minutes for 50% completion. The value of rate constant k would be: **1 Mark**

A 2.5×10^{-3} min^{-1}
B 2.75×10^{-4} min^{-1}
C 1.25×10^{-3} min^{-1}
D 2.31×10^{-3} min^{-1}

Q13. **Assertion (A):** 0.1M solution of KCl has greater osmotic pressure than 0.1M solution of glucose at same temperature.
Reason (R): In solution, KCl dissociates to produce more number of particles.

A Both Assertion (A) and Reason (R) are correct statements, and Reason (R) is the correct explanation of the Assertion (A).
B Both Assertion (A) and Reason (R) are correct statements, but Reason (R) is not the correct explanation of the Assertion (A).
C Assertion (A) is correct, but Reason (R) is wrong statement.
D Assertion (A) is wrong, but Reason (R) is correct statement.

Q14. Out of the following transition elements, the maximum number of oxidation states are shown by:

A Sc (Z = 21)
B Cr (Z = 24)
C Mn (Z = 25)
D Fe (Z = 26)

Q15. Zinc is coated over iron to prevent rusting of iron because:

A $E^\circ_{Zn^{2+}/Zn} = E^\circ_{Fe^{2+}/Fe}$
B $E^\circ_{Zn^{2+}/Zn} < E^\circ_{Fe^{2+}/Fe}$
C $E^\circ_{Zn^{2+}/Zn} > E^\circ_{Fe^{2+}/Fe}$
D None of these.

Q16. In a Leclanche dry cell, the cathode is:

A Zn container
B MnO_2
C Graphite rod
D NH_4Cl

Q17. On the basis of crystal field theory, electronic configuration of d^4 complex when $\Delta_0 > P$ is:

A $t_{2g}3e_g1$
B $t_{2g}2e_g2$
C $t_{2g}1e_g3$
D $t_{2g}4e_g0$

Q18. On dissolving ammonium chloride in water at room temperature, the solution feels cool to touch. Under which of the following conditions does salt dissolve faster? **1 Mark**

A Powdered salt in cold water
B Powdered salt in hot water
C Salt crystals in cold water
D Salt crystals in hot water

Q19. If the standard electrode potential of an electrode is greater than zero, then we can infer that its: **1 Mark**

A Reduced form is more stable compared to hydrogen gas.
B Oxidised form is more stable compared to hydrogen gas.
C Reduced and oxidised forms are equally stable.
D Reduced form is less stable than the hydrogen gas.

Q20. The rate constant for a first order reaction is equal to the initial rate of reaction when the initial concentration of the reactant is: **1 Mark**

A 1×10^{-2}M
B 1M
C 10M
D 0.1M

Q21. The amount of electricity required to produce one mole of Zn from $ZnSO_4$ solution will be: **1 Mark**

A 3F
B 2F
C 1F
D 4F

Q22. Kohlrausch given the following relation for strong electrolytes: **1 Mark**

$\Lambda = \Lambda_0 - A\sqrt{C}$

Which of the following equality holds?

A $\Lambda = \Lambda_0$ as $C \rightarrow \sqrt{A}$ **B** $\Lambda = \Lambda_0$ as $C \rightarrow \infty$

C $\Lambda = \Lambda_0$ as $C \rightarrow 0$ **D** $\Lambda = \Lambda_0$ as $C \rightarrow 1$

Q23. $Ag^+(aq) + e^- \rightarrow Ag\ (s)$ $E° = +0.80$ V **1 Mark**

Fe2+ (aq) + 26^- → Fe (s) E° = -0.44 V

Find the E°cell for:

$Fe\ (s) + 2Ag^+\ (aq) \rightarrow Fe^{2+}\ (aq) + 2Ag\ (s)$

A 1.6V **B** -1.16 V **C** 2.04 V **D** 1.24 V

Q24. Two statements are given- one labelled Assertion (A) and the other labelled Reason (R). Select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below: **1 Mark**

Assertion (A): The molecularity of the reaction H2 + Br_2 → 2HBr appears to be 2.

Reason (R): Two molecules of the reactants are involved in the given elementary reaction.

A Both Assertion (A) and Reason (R) are correct statements, and Reason (R) is the correct explanation of the Assertion (A).

B Both Assertion (A) and Reason (R) are correct statements, but Reason (R) is not the correct explanation of the Assertion (A).

C Assertion (A) is correct, but Reason (R) is incorrect statement.

D Assertion (A) is incorrect, but Reason (R) is correct statement.

Q25. **Assertion (A):** Hydrolysis of an ester follows first order kinetics.

Reason (R): Concentration of water remains nearly constant during the course of the reaction.

A Both Assertion (A) and Reason (R) are correct statements, and Reason (R) is the correct explanation of the Assertion (A).

B Both Assertion (A) and Reason (R) are correct statements, but Reason (R) is not the correct explanation of the Assertion (A).

C Assertion (A) is correct, but Reason (R) is wrong statement.

D Assertion (A) is wrong, but Reason (R) is correct statement.

Q26. The most common and stable oxidation state of a Lanthanoid is:

A +2 **B** +3 **C** +4 **D** +6

Q27. For Questions two statements are given — one labelled as Assertion (A) and the other labelled as Reason (R). Select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below.

Assertion (A): When NaCl is added to water a depression in freezing point is observed.

Reason (R): NaCl undergoes dissociation in water.

A Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A).

B Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of the Assertion (A).

C Assertion (A) is true, but Reason (R) is false.

D Assertion (A) is false, but Reason (R) is true.

Q28. **Assertion (A):** Elevation in boiling point is a colligative property. **1 Mark**

Reason (R): Elevation in boiling point is directly proportional to molarity.

A Both Assertion (A) and Reason (R) are correct statements, and Reason (R) is the correct explanation of the Assertion (A).

B Both Assertion (A) and Reason (R) are correct statements, but Reason (R) is not the correct explanation of the Assertion (A).

C Assertion (A) is correct, but Reason (R) is wrong statement.

D Assertion (A) is wrong, but Reason (R) is correct statement.

Q29. The half-life period for a zero order reaction is equal to: **1 Mark**

A $\frac{0.693}{k}$ **B** $\frac{2k}{[R]_0}$

C $\frac{2.303}{k}$ **D** $\frac{[R]_0}{2k}$

Q30. **1 Mark**

50mL of an aqueous solution of glucose $C_6H_{12}O_6$ (Molar mass: 180g/ mol) contains 6.02×10^{22} molecules. The concentration of the solution will be:

A 0.1M **B** 0.2M **C** 1.0M **D** 2.0M

Q31. In a chemical reaction X → Y, it is found that the rate of reaction doubles when the concentration of X is increased four times. The order of the reaction with respect to X is: **1 Mark**

A 1 **B** 0 **C** 2 **D** $\frac{1}{2}$

Q32. For an electrolyte undergoing association in a solvent, the v factor: **1 Mark**

A is always greater than one
B has negative value
C has zero value
D is always less than one

Q33. Which of the following is affected by catalyst? **1 Mark**

A △H **B** △G **C** E_a **D** △S

Q34. For the reaction X + 2Y → P, the differential form equation of the rate law is: **1 Mark**

A $\frac{2d[P]}{dt} = \frac{d[Y]}{dt}$
B $\frac{-d[P]}{dt} = \frac{-d[X]}{dt}$
C $\frac{+d[X]}{dt} = \frac{-d[P]}{dt}$
D $\frac{+2d[Y]}{dt} = \frac{+d[P]}{dt}$

Q35. **Assertion (A):** For complex reactions molecularity and order are not same.
Reason (R): Order of reaction may be zero.

A Both Assertion (A) and Reason (R) are correct statements, and Reason (R) is the correct explanation of the Assertion (A).
B Both Assertion (A) and Reason (R) are correct statements, but Reason (R) is not the correct explanation of the Assertion (A).
C Assertion (A) is correct, but Reason (R) is wrong statement.
D Assertion (A) is wrong, but Reason (R) is correct statement.

Q36. The unit of rate constant depends upon the:

A Molecularity of the reaction.
B Activation energy of the reaction.
C Order of the reaction.
D Temperature of the reaction.

Q37. For a zero order reaction, the slope in the plot of [R] Vs. time is:

A $\frac{-k}{2.303}$
B $-k$
C $\frac{+k}{2.303}$
D $+k$

Q38. In an electrochemical process, a salt bridge is used:

A As a reducing agent.
B As an oxidizing agent.
C To complete the circuit so that current can flow.
D None of these.

Q39. **Assertion (A):** An ideal solution obeys Henry's law. **1 Mark**
Reason (R): In an ideal solution, solute-solute as well as solventsolvent interactions are similar to solute-solvent interaction.

A Both Assertion (A) and Reason (R) are correct statements, and Reason (R) is the correct explanation of the Assertion (A).
B Both Assertion (A) and Reason (R) are correct statements, but Reason (R) is not the correct explanation of the Assertion (A).
C Assertion (A) is correct, but Reason (R) is wrong statement.
D Assertion (A) is wrong, but Reason (R) is correct statement.

Q40. Which of the following solutions of KCl will have the highest value of specific conductance? **1 Mark**

A 0.5M **B** 0.01M **C** 0.1M **D** 1.0M

Q41. The unit of the rate of reaction is the same as that of the rate constant for a: **1 Mark**

A First order reaction. **B** Zero order reaction. **C** Second order reaction. **D** Half-order reaction.

Q42. In fuel cell: **1 Mark**

A Chemical energy is converted to electrical energy.
B Energy of combustion of fuel is converted to chemical energy.
C Energy of combustion of fuel is converted to electrical energy.
D Electrical energy is converted to chemical energy.

Q43. 1 faraday = _____. **1 Mark**

A 10000 C **B** 95000 C **C** 96.5 C **D** 96500 C

Q44. On the basis of information given below mark the correct option. **1 Mark**

Information:
In bromoethane and chloroethane mixture intermolecular interactions of A–A and B–B type are nearly same as A–B type interactions.
In ethanol and acetone mixture A–A or B–B type intermolecular interactions are stronger than A–B type interactions.
In chloroform and acetone mixture A–A or B–B type intermolecular interactions are weaker than A–B type interactions.

A Solution (B) and (C) will follow Raoult's law.
B Solution (A) will follow Raoult's law.
C Solution (B) will show negative deviation from Raoult's law.
D Solution (C) will show positive deviation from Raoult's law.

Q45. For two statements are given-one labelled Assertion (A) and the other labelled Reason (R). Select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below.
Assertion: Rate constants determined from Arrhenius equation are fairly accurate for simple as well as complex molecules.
Reason: Reactant molecules undergo chemical change irrespective of their orientation during collision.

A Both A and R are true and R is the correct explanation of A.
B Both A and R are true but R is not the correct explanation of A.
C A is true but R is false.
D A is false and R is also false.

Q46. Anode in the galvanic cell is:

A Negative electrode. **B** Positive electrode. **C** Neutral electrode. **D** None of the above.

Q47. The internal resistance of a lead acid battery can be reduced by:

A Using strips of wood or celluloid as separators between electrodes.
B Using grids of hard lead-antinomy alloy.
C Using a specific manner of assembly of electrodes with wood or celluloid separators in between.
D Both option A and B.

Q48. The EMF of a galvanic cell is determined by using a: **1 Mark**

A Voltmeter. **B** 1potentiometer. **C** Coulometer. **D** Ammeter.

Q49. In corrosion of iron, **1 Mark**

A Electrons flow from anode to cathode through the metal, while ions flow through the water droplets.
B An electrochemical (galvanic) cell is formed in which Fe acts as anode and O_2 is reduced at cathode.
C Dissolved O_2 oxidizes Fe^{2+} to Fe^{3+} before it is deposited as rust ($Fe_2O_3.xH_2O$).
D All of the above takes place.

Q50. **Note:** In the following question two or more options may be correct. **1 Mark**
Which of the following statements are applicable to a balanced chemical equation of an elementary reaction?

A Order is same as molecularity.
B Order is less than the molecularity.
C Order is greater than the molecularity.
D Molecularity can never be zero.

Q51. Which of the following theory is not related to the chemical kinetics? **1 Mark**

A Collision theory **B** Absolute theory **C** Absolute reaction rate **D** VSEPR theory

Q52. If 2gm of NaOH is present is 200ml of its solution, its molarity will be: **1 Mark**

A 0.25 **B** 0.5 **C** 5 **D** 10

Q53. The vapour pressure of water at 300K in a closed container is 0.4 atm. If the volume of the container is doubled, its vapour pressure at 300K will be: **1 Mark**

A 0.8 atm **B** 0.2 atm **C** 0.4 atm **D** 0.6 atm

Q54. Half life for a Ist order reaction A ⟶ product, is 60 minute. What % of A remains after 120min? **1 Mark**

A 25% **B** 50% **C** 75% **D** 90%

Q55. For two statements are given-one labelled Assertion (A) and the other labelled Reason (R). Select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below. **1 Mark**

Assertion: If one component of a solution obeys Raoult's law over a certain range of composition, the other component will not obey Henry's law in that range.

Reason: Raoult's law is a special case of Henry's law.

A Both A and R are true and R is the correct explanation of A.

B Both A and R are true but R is not the correct explanation of A.

C A is true but R is false.

D A is false and R is also false.

Q56. Which of the following is a true solution?

A Sugar-water mixture **B** Copper in silver **C** Milk **D** Mud in water

Q57. Consider the Arrhenius equation given below and mark the correct option.

$k = A\, e^{\frac{-E_a}{RT}}$.

A Rate constant increases exponentially with increasing activation energy and decreasing temperature.

B Rate constant decreases exponentially with increasing activation energy and decreasing temperature.

C Rate constant increases exponentially with decreasing activation energy and decreasing temperature.

D Rate constant increases exponentially with decreasing activation energy and increasing temperature.

Q58. 1In electro-chemical corrosion of metals, the metal undergoing corrosion:

A Becomes anode. **B** Becomes cathode. **C** Becomes inert. **D** None is correct.

Q59. **Note:** In the following question two or more options may be correct.

In any unimolecular reaction _____.

A Only one reacting species is involved in the rate determining step.

B The order and the molecularity of slowest step are equal to one.

C The molecularity of the reaction is one and order is zero.

D Both molecularity and order of the reaction are one.

Q60. In these questions, a statement of assertion followed by a statement of reason is given. Choose the correct answer out of the following choices. **1 Mark**

Assertion: Identification of cathode and anode is done by the use of a thermometer.

Reason: Higher the value of reduction potential, greater would be its oxidising power.

A Assertion and reason both are correct statements and reason is correct explanation for assertion.

B Assertion and reason both are correct statements but reason is not correct explanation for assertion.

C Assertion is correct statement but reason is wrong statement.

D Assertion is wrong statement but reason is correct statement.

Q61. At equilibrium the rate of dissolution of a solid solute in a volatile liquid solvent is _____. **1 Mark**

A Less than the rate of crystallisation.

B Greater than the rate of crystallisation.

C Equal to the rate of crystallisation.

D Zero.

Q62. The mass of a non - volatile non - electrolyte solute (molar mass = 50g mol−1) needed to be dissolved in 114g octane to reduce its vapour pressure to 75% is: **1 Mark**

A 37.5g **B** 75g **C** 150g **D** 50g

Q63. For the combustion of carbon, $\triangle H = -_{ve}$ and $\triangle S = +_{ve}$ and hence, thermodynamically the process is spontaneous at all temperatures. But coal stored in coal depots does not burn automatically because of: **1 Mark**

A Very high threshold energy barrier.
B Thermodynamically stability of coal.
C Lower energy of activation needed for burning.
D Low temperature in coal depots.

Q64. What does it mean when a collision is elastic? **1 Mark**

A No energy is gained or lost.
B Energy is gained.
C Energy is lost.
D The particles can stretch out.
E The particles slow down.

Q65. In an endothermic process, solubility increases with _____ in temperature: **1 Mark**

A Increase **B** Decrease **C** Remains same **D** None of the above

Q66. The rate of reaction increase by the increase of temperature because: **1 Mark**

A Collision frequency is increased.
B Energy of products decreases.
C The fraction of molecules possessing energy ≥ET(threshold energy) increases.
D Mechanism of a reaction is changed.

Q67. Which has the lowest boiling point at 1atm pressure?

A 0.1 M KCl **B** 0.1 M Urea **C** 0.1 M $CaCl_2$ **D** 0.1 M $A1Cl_3$

Q68. Schematic diagram of an electrolytic-cell is:

A 
B 
C 
D None is correct presentation

Q69. How much oxygen is dissolved in 100rnL water at 298K if partial pressure of oxygen is 0.5atm and K = 1.4×10^{-3} mol/ L/ atm?

A 22.4mg **B** 22.4g **C** 2.24g **D** 2.24mg

Q70. A catalyst is a substance which:

A Increases the equilibrium constant of the reaction.
B Increases equilibrium concentration of products.
C Does not alter the reaction mechanism.
D Changes the activation energy of the reaction.

Q71. The electric charge for electrode deposition of one gram equivalent of a substance is:

A 1 ampere s^{-1} **B** 96500 coulomb s^{-1} **C** 1 ampere $hour^{-1}$ **D** 1 coulomb s^{-}

Q72. The boiling point of an azeotropic mixture of water and ethanol is less than that of water and ethanol. The mixture shows: **1 Mark**

A No deviation from Raoult's Law.
B Positive deviation from Raoult's Law.
C Negative deviation from Raoult's Law.
D That the solution is unsaturated.

Q73. In these questions, a statement of assertion followed by a statement of reason is given. Choose the correct answer out of the following choices. **1 Mark**
Assertion: The decomposition of NH_3 on finely divided platinum surface is first order when the concentration is low, however at higher concentration, the reaction becomes zero order.
Reason: In first order reaction, the rate of reaction is proportional to the first power of the concentration of the reactant.

A Assertion and reason both are correct statements and reason is correct explanation for assertion.
B Assertion and reason both are correct statements but reason is not correct explanation for assertion.
C Assertion is correct statement but reason is wrong statement.
D Assertion is wrong statement but reason is correct statement.

Q74. **1 Mark**

The pressure that a single component in a gaseous mixture would exert if it existed alone in the same volume as the mixture and at the same temperature as the mixture is referred to as.

A Absolute pressure
B Partial pressure
C Total pressure of a gas mixture
D None of the mentioned

Q75. In an electrolytic cell cathode acts as: **1 Mark**

A An oxidizing agent. **B** Reducing agent. **C** Either of the two. **D** Neither of the two.

Q76. Which statements describe the condition(s) required for a successful formation of a product in a reaction? **1 Mark**

A The collision must involve a sufficient amount of energy, provided from the motion of the particles, to overcome the activation energy.
B The relative orientation of the particles has little or no effect on the formation of the product.
C The relative orientation of the particles has an effect only if the kinetic energy of the particles is below some minimum value.
D The relative orientation of the particles must allow for formation of the new bonds in the product.
E The energy of the incoming particles must be above a certain minimum value and the relative orientation of the particles must allow for formation of new bonds in the product.

Q77. Water is decomposed into hydrogen and oxygen by means of electric current by the process:

A Electrolysis. **B** Electric heating. **C** Electroplating. **D** None of these.

Q78. Read the following passage and answer the questions that follow:
The rate of reaction is concerned with decrease in concentration of reactants or increase in the concentration of products per unit time. It can be expressed as instantaneous rate at a particular instant of time and average rate over a large interval of time. A number of factors such as temperature, concentration of reactants, catalyst affect the rate of reaction. Mathematical representation of rate of a reaction is given by rate law:
Rate = $k[A]^x [B]^y$
x and y indicate how sensitive the rate is to the change in concentration of A and B. Sum of x + y gives the overall order of a reaction. When a sequence of elementary reactions gives us the products, the reactions are called complex reactions. Molecularity and order of an elementary reaction are same. Zero order reactions are relatively uncommon but they occur under special conditions. All natural and artificial radioactive decay of unstable nuclei take place by first order kinetics.

1. What is the effect of temperature on the rate constant of a reaction?
2. For a reaction A + B Product, the rate law is given by, $\text{Rate} = k[A]^2[B]^{\frac{1}{2}}$. What is the order of the reaction?
3. How order and molecularity are different for complex reactions?
4. A first order reaction has a rate constant $2 \times 10^{-3} s^{-1}$. How long will 6g of this reactant take to reduce to 2g?

OR

The half life for radioactive decay of ^{14}C is 6930 years. An archaeological artifact containing wood had only 75% of the ^{14}C found in a living tree. Find the age of the sample.
[log 4 = 0.6021 log 3 = 0.4771 log 2 = 0.3010 log 10 = 1]

Q79. The rate of reaction is concerned with decrease in concentration of reactants or increase in the concentration of products per unit time. It can be expressed as instantaneous rate at a particular instant of time and average rate over a large interval of time. Mathematical representation of rate of reaction is given by rate law. Rate constant and order of a reaction can be determined from rate law or its integrated rate equation. **4 Marks**

1. What is average rate of reaction?
2. Write two factors that affect the rate of reaction.
3.
   1. What happens to rate of reaction for zero order reaction?
   2. What is the unit of k for zero order reaction?

OR

1. For areaction P + 2Q → Products

$Rat = k[P]^{\frac{1}{2}}[Q]^{1}$. What is the order of the reaction?

2. Define pseudo first order reaction with an example.

Q80. Read the passage given below and answer the questions that follow: **5 Marks**

The rate law for a chemical reaction relates the reaction rate with the concentrations or partial pressures of the reactants. For a general reaction aA + bB → C with no intermediate steps in its reaction mechanism, meaning that it is an elementary reaction, the rate law is given by $r = k[A]^x [B]^y$, where [A] and [B] express the concentrations of A and B in moles per litre. Exponents x and y vary for each reaction and are determined experimentally. The value of k varies with conditions that affect reaction rate, such as temperature, pressure, surface area, etc. The sum of these exponents is known as overall reaction order. A zero order reaction has a constant rate that is independent of the concentration of the reactants. A first order reaction depends on the concentration of only one reactant. A reaction is said to be second order when the overall order is two. Once we have determined the order of the reaction, we can go back and plug in one set of our initial values and solve for k.

1. Calculate the overall order of a reaction which has the following rate expression:

$Rate = k[A]^{\frac{1}{2}}[B]^{\frac{3}{2}}$

2. What is the effect of temperature on rate of reaction?
3. What is meant by rate of a reaction?
4. A first order reaction takes 77·78 minutes for 50% completion. Calculate the time required for 30% completion of this reaction. (log 10 = 1, log 7 = 0·8450).

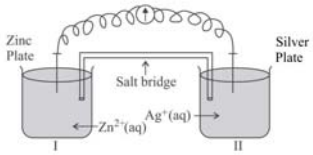
OR

A first order reaction has a rate constant 1×10^{-3} per sec. How long will 5g of this reactant take to reduce to 3g? (log 3 = 0·4771; log 5 = 0·6990).

Q81. Read the passage given below and answer the questions that follow:

Oxidation-reduction reactions are commonly known as redox reactions. They involve transfer of electrons from one species to another. In a spontaneous reaction, energy is released which can be used to do useful work. The reaction is split into two half reactions. Two different containers are used and a wire is used to drive the electrons from one side to the other and a Voltaic/Galvanic cell is created. It is an electrochemical cell that uses spontaneous redox reactions to generate electricity. A salt bridge also connects to the half cells. The reading of the voltmeter gives the cell voltage or cell potential or electromotive force. If E° n is positive the reaction is spontaneous and if it is negative the reaction is non-spontaneous and is referred to as electrolytic cell. Electrolysis refers to the decomposition of a substance by an electric current. One mole of electric charge when passed through a cell will discharge half a mole of a divalent metal ion such as Cu 2+. This was first formulated by Faraday in the form of laws of electrolysis.

The conductance of material is the property of materials due to which a material allows the flow of ions through itself and thus conducts electricity. Conductivity is represented by k and it depends upon nature and concentration of electrolyte, temperature etc. A more common term molar conductivity of a solution at a given concentration is conductance of the volume of solution containing one mole of electrolyte kept between two electrodes with the unit area of cross-section and distance of unit length. Limiting molar conductivity of weak electrolytes cannot be obtained graphically.



1. Is silver plate the anode or cathode?
2. What will happen if the salt bridge is removed?
3. When does electrochemical cell behaves like an electrolytic cell?
4.

1. What will happen to the concentration of Zn^{2+} and Ag^{+} when $E_{cell} = 0$.
2. Why does conductivity of a solution decreases with dilution?

OR

The molar conductivity of a 1.5M solution of an electrolyte is found to be 138.9S cm^2 mol. Calculate the conductivity of this solution.

Q82. Read the passage given below and answer the following questions: **5 Marks**

At 298 K, the vapour pressure of pure benzene, C_6, H_6 is 0.256 bar and the vapour pressure of pure toluene C_6 H_5 CH_3 is 0.0925 bar. Two mixtures were prepared as follows:

1. 7.8g of C_6 H_6 + 9.2g of toluene
2. 3.9g of C_6 H_6 + 13.8g of toluene

The following questions are multiple choice questions. Choose the most appropriate answer:

1. The total vapour pressure (bar) of solution I is.
1. 0.128
2. 0.174
3. 0.198
4. 0.258
2. Which of the given solutions have higher vapour pressure?
1. I
2. II
3. Both have equal vapour pressure
4. Cannot be predicted
3. Mole fraction of benzene in vapour phase in solution I is.
1. 0.128
2. 0.174
3. 0.734
4. 0.266
4. Which of the following statements is/are correct?
1. Mole fraction of toluene in vapour phase is more in solution I.
2. Mole fraction of toluene in vapour phase is less in solution I.
3. Mole fraction of benzene in vapour phase is less in solution I.
1. Only II
2. Only I
3. I and III
4. II and III
5. Solution I is an example of a/an.
1. Ideal solution.
2. Non-ideal solution with positive deviation.
3. Non-ideal solution with negative deviation.
4. Can't be predicted.