Revision Chemistry

A complete Revision material for class XII as per new syllabus of NCERT

Revision Booket-1

1. Solid State–4marks
2. Solution–5marks
3. Electrochemistry–5marks
4. Chemical Kinetics–5marks

As per the previous CBSE papers from the above four chapters 10 marks questions are based on Theory & 09 marks questions are based on Numericals.

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Unit: 1- Solid state (4 marks)

1. Explain the following with suitable examples : (a)Schottky defect (b)Frenkel defect
2. What is the effect of Schottky defect and Frenkel defects on the density of crystals.
3. Which point defect lowers the density of crystal?
4. Which point defect increases the density of crystal?
5. Which point defect does not alters the density of crystal?
6. Why are Frenkel defects not found in pure alkali halides?
7. Why are Frenkel defects found in AgCl?
8. Explain how vacancies are introduced in an ionic solid when a cation of higher valence is added as an impurity in it?
9. What type of defect can arise when a solid is heated? Which physical property is affected by it and in what way?
10. What type of stoichiometric defect is shown by :(a)ZnS (b)AgBr
11. What type of defect is produced when NaCl is doped with $MgCl_2$ or $SrCl_2$.
12. Ionic solids which have anionic vacancies due to metal excess develop colour.Explain with the example. OR Explain the term F –centers.
13. Name the non- stoichiometric defect responsible for colour in alkali halides.
14. What makes the crystal of KCl appear sometimes violet?
15. Why common salt is sometime yellow instead of being pure white.
16. Mention one property which is caused due to presence of F –centre in a solid?
17. Zinc oxide is white but it turns yellow on heating .Why
18. Explain the following non- stoichiometric defects: (i) metal excess defect due to presence interstitial cation (ii) Metal deficiency defect.
19. If NaCl is doped with 10^{-3} mol % of $SrCl_2$, what is the concentration of cation vacancies.
20. What is a semiconductor? Describe the two main types of semiconductors and contrast their conduction mechanism
21. What is the difference between Phosphorous and gallium doped semiconductors
22. Classify each of the following as being either a n-type or p-type semiconductor : (i)Ge doped with In (ii)B doped with Si (iii) Si doped with B
23. What typeof semiconductor is obtained when silicon is doped with arsenic.
24. Explain the following with suitable examples: (i) 12-16 and 13-15 group compounds.
25. Explain the following with suitable examples : (i)paramagnetism (ii)Diamagnetism (iii)Ferromagnetism(d)Anti Ferromagnetism (e)Ferrimagnetism
26. Define the term 'amorphous'. Give a few examples of amorphous solids
27. What type of interactions hold the molecules together in a polar molecular solid.
28. Write a distinguishing feature of metallic solids.
29. How do metallic and ionic substances differ in conducting electricity?
30. Calculate the Number of atoms per unit cell in Simple cubic; Body centred Cubic (bcc), Face-centred cubic (fcc).
31. How many lattice points are there in one unit cell of each of the following lattice? (i) Face-centred cubic (ii) Face-centred tetragonal (iii) Body-centre**d[Ans:14,14,09]**
32. What is the coordination number of atom in a cubic close-packed structure?(b) in a body-centred cubic structure? (ii) in two dimensional Sqaure close packed layer

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33. A cubic solid is made of elements P and Q. Atoms of Q are at corners of the cube and P at body centre.What isformula of the compound? What are the coordination numbers of P and Q?**[Ans:PQ,8]**
34. A compound is formed by two elements X and Y. Atoms of the element Y (as anions) make *ccp* and those of the element X (as cations) occupy all the octahedral voids. What is the formula of the compound? **[Ans:XY]**
35. Atoms of element B form *hcp* lattice and those of the element A occupy 2/3rd of tetrahedral voids. What is the formula of the compound formed by the elements A and B? **[Ans:A_4B_3]**
36. A compound forms hexagonal close-packed structure. What is the total number of voids in 0.5 mol of it? How many of these are tetrahedral voids? **[Ans: Total number of voids=9.033×10^{23}]**
37. A compound is formed by two elements M and N. The element N forms *ccp* and atoms of M occupy 1/3rd of tetrahedral voids. What is the formula of the compound? **[Ans:M_2N_3]**
38. How can you determine the atomic mass of an unknown metal if you know its density and the dimension of its unit cell? Explain.
39. **Give the relationship between edge length (a) of unit cell and radius of atom(r) for** Simple cubic; Body centred Cubic (bcc), Face-centred cubic (fcc).
40. An element has a body –centered cubic structure with a cell edge of 314 pm.The density of the element is 10.3 g/cm^3. Calculate the atomic mass of element. **[Ans:96 g/mol]**
41. Silver crystallizes in fcc lattice. If edge length of the cell is 4.07×10^{-8}cm and density is 10.5 g cm^{-3}, calculate the atomic mass of silver. **[Ans: 107.12 g/mol]**
42. An element (atomic mass = 60) having FCC unit cell has a density of 6.23g/cm^3 .What is the edge length of the unit cell? **[Ans:400 pm]**
43. The density of chromium is 7.2 g/cm^3 .If the unit cell is cubic with edge length of 289 pm, determine the type of the unit cell.(Atomic mass of Cr = 52amu) **[Ans:bcc]**
44. Determine the type of cubic lattices to which the iron crystal belongs if its unit cell has an edge length of 286 pm and the density of iron crystals is 7.86 g/cm^3. **[Ans: Z= 1.97,bcc]**
45. Iron has bcc unit cell with cell edge of 286.65 pm.The density of iron is 7.874 g/cm^3. Calculate the value of Avogadro constant (atomic mass of Fe = 56$gmol^{-1}$) **[Ans: 6.043×10^{23}]**
46. An element has a body –centered cubic structure with a cell edge of 288pm.The density of the element is 7.2 g/cm^3 .How many atoms are present in 208 g of the element?
47. The density of copper metal is 8.95 g/cm^3 .If the radius of copper atom be 127.8pm,is the copper unit cell simple cubic,body centred cubic or face centred cubic? **[Ans: FCC]**
48. Niobium crystallises in body-centred cubic structure.If density is 8.55 g cm^{-3}, calculate atomic radius of niobium using its atomic mass 93 u.**[Ans: $a^3 = 36.13 \times 10^{-24}$ cm^3 ,a = 3.31×10^{-8} cm, r = 14.29×10^{-7} cm**]
49. Silver crystallizes in fcc lattice.Each side of the unit cell has a length of 409pm.What is the radius of an atom of silver. **[Ans:144.6pm]**
50. Aluminium crystallises in a cubic close-packed structure. Its metallic radius is 125 pm.(i) What is the length of the side of the unit cell? (ii) How many unit cells are there in 1.00 cm^3 of aluminium? **[Ans ; (i)354pm (ii)2.26×10^{22} unit cells]**
51. Gold (atomic radius = 0.144 nm) crystallises in a face-centred unit cell. What is the length of a side of the cell? **[Ans:0.407nm]**
52. Analysis shows that nickel oxide has the formula $Ni_{0.98}O_{1.00}$. What fractions of nickel exist as Ni^{+2} and Ni^{+3} ions? **[Ans: Ni^{+2} = 96% and Ni^{+3} = 4%]**

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53. Calculate the efficiency of packing in case of a metal crystal for (i)simple cubic (ii)body –centered cubic (iii)face –centered cubic **[Ans: (Simplcubic=52%)(bcc=68%)(fcc=74%)]**
54. If the radius of the octahedral void is r and radius of the atoms in close packing is R, derive relation between r and R. **[Ans:r =0.414R]**

Unit: 2:-SOLUTIONS (5 marks)

1. **Define: Molality, Molarity, Mole fraction. Write their formulas also.**
2. **Which out of the Molality & Molarity is better way to express the concentration of solution and why?**
3. Concentrated nitric acid used in the laboratory work is 68% nitric acid by mass in aqueous solution. What should be the molarity of such a sample of the acid if the density of the solution is 1.504 g/ml?
4. An antifreeze solution is prepared from 222.6g of ethylene glycol. $C_2H_4(OH)_2$ and 200g of water. Calculate molality of solution. If the density of the solution is 1.072 g/ml then what shall be the molarity of the solution?
5. A solution of glucose in water is labelled as 10% w/w. What should be the molality and mole fraction of each component in the solution? If the density of solution is 1.2g/ml, then what shall be the molarity of the solution?
6. If the density of some lake water is 1.25 g/ml and contains 92g of Na^+ ions per Kg of water, calculate the molality and molarity of Na^+ ions in the lake.
7. **State Henry law with its mathematical expressions. Explain the significance of Henry's law constant. At same temperature, hydrogen is more soluble in water than helium .Which of them will have larger value of K_H**
8. **Mention some of important applications Henry law.**
9. Why do gases always tend to be less soluble in liquids as the temperature is raised?
10. What is the effect of rise in temperature on solubility of a gas?
11. If N_2 gas is bubbled through water at 298 K, how many millimoles of N_2 gas would dissolve in 1 litre of water .Assume that N_2 exerts a partial pressure of 0.987 bar . Henry's law constant for N_2 at 293K is 76.48 bar.
12. Henry's law constant for CO_2 in water is 1.67×10^8Pa at 298 K .calculate the quantity of CO_2 in 500ml of soda water when packed under 2.5 atm CO_2 pressure at 298 K.
13. **State Raoults law for a solution of volatile liquids .Give its mathematical relationship.**
14. Vapour pressure of chloroform ($CHCl_3$) and dichloroform (CH_2Cl_2) at 298 K are 200 mm Hg and 415 mm Hg respectively. (i) Calculate the vapour pressure of the solution prepared by mixing 25.5 g of $CHCl_3$ and 40.0 g of CH_2Cl_2 at 298 K and (ii) mole fractions of each component in vapour phase.
15. 100 g of liquid A(molar mass 140g/mol) was dissolved in 1000g of liquid B(molar mass 180g/mol)the vapour pressure of pure B was found to be 500 torr.Calculate the vapour pressure of pure A and its vapour pressure in solution if total vapour pressure of a solution is recorded as 475 torr.
16. **Why is vapour pressure of a solution of glucose in water lower than that of Water?**
17. **What is an ideal solution? What type of solutions are likely to behave as ideal solutions? Draw the plot of vapour pressure and mole fraction of an ideal solution at constant temperature.**

18. **Explain along with diagrams the conditions for the Non ideal solutions exhibiting Positive deviations & Negative deviations .Write some examples of Non ideal solutions exhibiting Positive deviations.**
19. When X and Y are mixed the solution becomes warmer and Y and Z are mixed the solution becomes cooler? Which of these solutions will exhibit positive deviation and solutions will exhibit negative deviation?
20. What type of non idealities are exhibited by cyclohexane –ethanol and acetone-chloroform mixtures? Give reasons for your answer.
21. **What are Azeotropes? Give one example each of minimum boiling and maximum boiling azeotropes.**
22. Acetone (bp329K) and carbon disulphide (bp320K) are mixed in a definite composition so that the mixture of two behaves like pure liquid and boils at 312 what name can be given to such a mixture?
23. 10cc of a liquid A is mixed with 10 cc of liquid B.The volume of resulting solution was found to be 19.9cc.what do you conclude.
24. **Define colligative properties. Show that Relative Lowering of vapour pressure is a colligative property.**
25. Vapour pressure of water at 293K is 17.535 mm Hg .calculate vapour pressure of water at 293 K when 25 g of glucose is dissolved in 450 g of water.
26. The vapour pressure of pure benzene at a certain temperature is 0.850 bar. A non volatile, non electrolyte solid weighing 0.5 g when added to 39.0 g benzene (molar mass 78g/mol).vapour pressure of the solution ,then is 0.845 bar. what is the molar mass of the solid substance?
27. Calculate the mass of a nonvolatile solute (molecular mass = 40) which should be dissolved in 114g octane to reduce its vapour pressure to 80%.
28. **Show that Elevation of boiling point is a colligative property.**
29. How will you determine the molecular mass of a non volatile substance by study of Elevation of boiling point of a solution?
30. 18 g glucose $C_6H_{12}O_6$ is dissolved in 1 kg of water in a saucepan. At what temperature will water at 1.013 bar? K_b for water is 0.52 $KKgmol^{-1}$.
31. The boiling point of benzene is 353.23K.when 1.80 g of a non volatile solute was dissolved in 90 g of benzene, the boiling point is raised to 354.11K.Calculate the molar mass of the solute? K_b for benzene is 2.53 $KKgmol^{-1}$.
32. A solution prepared by dissolving 1.25g of oil of wintergreen in 99.0g of benzene has a boiling point of 80.31^0C .Determine the molar mass of this compound(B.P. of pure benzene = 80.10^0C and K_b for benzene is 2.53 $KKgmol^{-1}$..)
33. **Show that depression of freezing point is a colligative property.**
34. How will you determine the molecular mass of a non volatile substance by study of depression of freezing point of a solution.
35. 1.00 g of non-electrolyte solute is dissolved in 50 g of benzene lowered the freezing point of benzene by 0.40K.The freezing point depression constant of benzene is 5.12$KKgmol^{-1}$ .Find the molar mass of the solute.
36. 45g of ethylene glycol ($C_2H_6O_2$)is mixed with 600g of water .calculate(a)Freezing point depression (b)Freezing point of the solution.

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37. Two elements A & B form compounds having molecular formula AB_2 & AB_4. When dissolved in 20g of C_6H_6, 1g AB_2 lowers the freezing point by 2.3 & 1.0g AB_4 lowers it by 1.3K.The molar depression constant for benzene is 5.1Kg mol^{-1}. Calculate atomic mass A & B**.**
38. A 5% solution (by mass) of cane sugar in water has freezing point of 271 K. calculate the freezing point of 5% glucose in water if freezing point of water is 273.15 K.11.
39. **What is osmotic pressure? Show that it is a colligative property.**
40. **Define (i)Semi permeable membrane (ii) osmosis (iii) isotonic solution (iv) Hypertonic (v) Hypotonic solution.**
41. **What is reverse osmosis? Give its application.**
42. 200 cm^3 of an aqueous solution of a protein contains 1.26 g of the protein .The osmotic pressure of such a solution at 300K is found to be$2.57x10^{-3}$bar.calculate the molar mass of the protein .
43. 100 mg of a protein is dissolved in enough water to make 10ml of a solution. If this solution has an osomotic pressure of 13.3 mm Hg at 25^0C,what is the molar mass of protein?(R=0.0821Latm$mol^{-1}K^{-1}$ and 760mmHg=1atm)
44. A solution prepared by dissolving 8.95mg of a gene fragment in 35.0ml of water has an osmotic pressure of 0.335 torr at 25^0C .Calculate its molar mass.
45. **What is Van't Hoff's factor? What is value of Van't Hoff's factor when the solute undergoes (a) association (b) dissociation?**
46. What mass of NaCl (molar mass =58.5) must be dissolved in 65g of water to lower the freezing point by 7.5^0C ? Assume Van't Hoff's factor =1.87.
47. Calculate the freezing point depression for 0.711m aqueous solution of sodium sulphate if it is completely ionised in solution.If this solution actually freezes at -0.320^0C ,What is the value of Van't Hoff factor for it at the freezing point.
48. Determine the amount of $CaCl_2$ (i = 2.47) dissolved in 2.5 litre of water such that its osmotic pressure is 0.75 atm at 27° C.
49. Determine the osmotic pressure of a solution prepared by dissolving 25 mg of K_2SO_4 in 2 litre of water at 25° C, assuming that it is completely dissociated.
50. 2g of Benzoic acid dissolved in 25 g of benzene shows a depression in freezing point equal to 1.62 K. K_f for benzene is 4.9 K Kg mol^{-1}. What is the percentage association of acid if it forms dimer.
51. **Amongst the following compounds, identify which are insoluble, partially soluble and highly soluble in water?(i) phenol (ii) toluene (iii) formic acid(iv) ethylene glycol (v) chloroform (vi) Pentanol.**
52. **Suggest the most important type of intermolecular attractive interaction in the following pairs.(i) n-hexane and n-octane(ii) I_2 and CCl_4(iii) $NaClO_4$ and water(iv) methanol and acetone (v) Acetonitrile (CH_3CN) and acetone (C_3H_6O).**

Unit: 3:-ELECTROCHEMISTRY – (5 marks)

1. Write the Nernst equation and emf of the following cells at 298K
(i)$Sn/Sn^{2+}(0.050M)//H^+(0.020M)/H_2(g)/Pt(s)$ $E^o_{Sn^{2+}/Sn}$= - 0.13V
(ii)$Zn/Zn^{2+}(0.1M)//Cd^{2+}(0.01)/Cd$; $E^o_{Zn^{2+}/Zn}$ = -0.76V , $E^o_{Cd^{2+}/Cd}$ = -0.40V
2. Calculate emf of the cell $Ni(s) + 2Ag^+ (0.002M) \rightarrow Ni^{+2}(0.160M) + 2Ag(s)$, E^o_{cell} =1.05 V
3. The following chemical reaction is occurring in an electrochemical cell $Mg(s) + 2Ag^+ (0.0001 M) \rightarrow Mg^{2+}(0.10M) + 2 Ag(s)$ The electrode values are Mg^{2+} / Mg = – 2. 36 V Ag^+ / Ag = 0.81 V. For this cell calculate / write (a) (i) E^0 value for the electrode 2 Ag^+ / Ag (ii) Standard cell potential E^0cell. (b) Cell potential (E)cell (c) (i) Symbolic representation of the above cell. (ii) Will the above cell reaction bespontaneous?

4. A Copper –silver is set up.The copper ion concentration in its is 0.10M.The concentration of silver is not known.The cell potential measured 0.422V.Determine the concentration of silver ion in the cell. $E^{o}_{Ag^{+}/Ag}$ = + 0.80V, $E^{o}_{Cu^{2+}/Cu}$ = +0.34V).
5. A voltaic cell is set up at 25^{0}C With the following half cells :Al(s)/Al^{3+}(0.001M) and Ni^{2+}(0.50)/Ni(s) ,Write the equation for the cell reaction that occurs when the cell generates an electric current and determine the cell potential $E^{o}_{Ni^{2+}/Ni}$ = -0.25V, $E^{o}_{Al^{3+}/Al}$(=-1.66V)
6. Calculate the potential for half cell containing .10M $K_2Cr_2O_7$(aq),0.20MCr^{3+}(aq) and 1.0x 10^{-4} H^{+} (aq) ,The half cell reaction is $Cr_2O_7^{2-}$(aq) + 14 H^{+} (aq) + 6e^{-}→ 2Cr^{3+}(aq) + 7H_2O(l) and the Standard cell potential E^{0}cell = 1.33V
7. In the button cell widely used in watches and devices the following reaction takes place: Zn (s)+ Ag_2O(s) + H_2O(l)→ Zn^{2+}(aq) + 2 Ag(s) + 2OH^{-} (aq) Determine Δ_rG^{0} &E^{0} for the reaction. $E^{o}_{Zn^{2+}/Zn}$ = -0.76V, $E^{o}_{Ag^{+}/Ag}$ = + 0.80V
8. 2Cr(s) + 3Cd^{2+} → 2Cr^{3+} + 3Cd(s) $E^{o}_{Cr^{3+}/Cr}$= - 0.74V , $E^{o}_{Cd^{2+}/Cd}$= - 0.40V .Find Δ_rG^{0} and K_c.
9. **Define conductivity,molar conductivity &. limiting molar conductivity**
10. **Express the relation among the cell constant ,the resistance of the solution in the cell and the conductivity of the solution .How is the conductivity of a solution relted to its molar conductivity.**
11. Resistance of conductivity cell filled with 0.1molL^{-1} KCl solution is 100 ohm. If the resistance of the same cell when filled with 0.02molL^{-1} KCl solution is 520 ohm. Calculate the conductivity & molar conductivity of 0.02molL^{-1} KCl solution. The conductivity of 0.1 molL^{-1} solution of KCl is 1.29Sm^{-1}.
12. **State Kohlrausch law and its application**. Limiting molar conductivity of NaCl, HCl and NaAc are 126.4, 425.9 &91 SCm^2 mol^{-1}.Calculate Limiting molar conductivity of HAc.
13. Conductivity of 0.00241M acetic acid is 7.896 X 10^{-6} S cm^{-1}. Calculate its molar conductivity. If Λ^{0} for acetic acid is 390.5 S cm^2 mol^{-1}. What is its dissociation constant?
14. **How do you account for conductivity of strong and weak electrolyte with concentration? Plot the graphs also.**
15. How much charge is required for following reduction: 1 mol of MnO_4^{-} to Mn^{2+}
16. How much electricity in terms of Faraday is required to produce 40g of Al from molten $AlCl_3$
17. How much electricity in terms of Coulomb is required for the oxidation of (i) 1 mol of H_2O to O_2 (ii) 1 mol of FeO to Fe_2O_3
18. A solution of $CuSO_4$ is electrolysed using a current of 1.5 amperes for 10 minutes. What mass of Cu is deposited at the cathode?
19. Three electrolytic cells A,B,C containing solutions $ZnSO_4$,$AgNO_3$,and $CuSO_4$ respectively are connected in series .A steady current of 1.5 amperes was passed though them until 1.45g of silver deposited at the cathode of cell B.How long did the current flow? What mass of copper and zinc were deposited?
20. **Classify Primary Cell or Secondary cell: Dry Cell ,Mercury Cell ,Lead Storage Battery Nickel cadmium cell .**
21. **Write the reaction involved in the Lead Storage Battery. What happens when Lead Storage Battery is recharged?**
22. **What is Nickel-Cadmium cell.State its one advantage & disadvantage over Lead Storage Battery.**
23. Santosh and his mother went to a shop to purchase a battery for their inverter. Shop keeper showed them two types of batteries one with Cadmium plates and other with lead plates.The battery with cadmium plates was more expensive than the lead battery. Santosh's mother wanted to purchase lead battery as it was cheaper. After reading above passage answer the following questions. (a) As a students of chemistry, why would you suggest to santosh's mother to buy the expensive cadmium plate battery. Give two reasons. (b) What are the values associated with the above decision.
24. **What is Fuel Cell? Explain with diagram & reaction involved in the following cell.**
25. **Define Corrosion. How it is prevented.**

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26. **Rusting of iron is said to be an electrochemical phenomenon. Explain using reactions.**
27. **Predict the products of electrolysis: (a) An aq. Solution of $AgNO_3$ with silver electrodes. (b) An aq. Solution of $AgNO_3$ with platinum electrodes. (c). An aq. Solution of H_2SO_4 with platinum electrodes. (d). An aq. Solution of $CuCl_2$ with platinum electrodes.**

Unit: 4:- CHEMICAL KINETICS (5 marks)

1. **Define the terms: Rate of reaction[2009, 10], Rate law [2011] & rate constant. [2011]**
2. **Explain the difference between average rate & Instantaneous rate of reaction[2010C]**
3. Express the rate of the following reaction in terms of disappearance of hydrogen & formation of ammonia in the reaction : $3H_2 + N_2 \rightarrow 2NH_3$ **[2007]**
4. In a reaction $2A \rightarrow$ Products, the concentration of A decreases from 0.5mol L^{-1} to 0.4 mol L^{-1} in 10 minutes. Calculate the rate during this interval?
5. **Define Order of reaction. [2009,2010,2011]**
6. **Give the units of rate constant for zero, first & second order reaction.**
7. Calculate the overall order of a reaction which has the rate expression
   (a) Rate = k $[A]^{1/2}$ $[B]^{3/2}$ (b) Rate = k $[A]^{3/2}$ $[B]^{-1}$
8. The decomposition reaction of ammonia gas on platinum surface has a rate constant = 2.5 x 10^{-4} mol L^{-1} S^{-1}. What is the order of the reaction?**[CBSE sample paper]**
9. Identify the reaction order from each of the following rate constants.**[2011,2011C]**
   (i) k = 2.3 x 10^{-5} L $mol^{-1}s^{-1}$ (ii) k = 3 x10^{-4} s^{-1} (iii) k = 3.3 x 10^{-7} $L^{-1}mol$ s^{-1}
10. The conversion of molecules x to y follows second order kinetics. If the concentration of x is increased to three times, how will it affect the rate of formation of y?
11. A reaction is first order in A and second order in B. (i) Write differential rate equation. (ii) How is the rate affected when concentration of B is tripled? (iii) How is the rate affected when the concentration of both A and B is doubled?
12. A reaction is second order with respect to a reactant. How is the rate of reaction affected if the concentration of the reactant is(i) doubled (ii) reduced to half ?
13. For the reaction A→ B the rate becomes 27 times when the concentration of A is increased 3 times. What is the order of reaction?
14. The decomposition of NH_3 on platinum surface is zero order reaction. What are the rates of production of N_2 and H_2 if k = 2.5 x 10^{-4} mol L^{-1} S^{-1}? **[2008]**
15. Explain the tem Molecularity with example **[2010,2011C]**.
16. **Define Rate determining step[2011C], Elementary reaction [2009]& Complex reactions**
17. **Distinguish between order of reaction & Molecularity. [2010C]**
18. Derive the Integrated rate equation for Zero order reaction. Find half life period and plot the graph associated to it.
19. The rate constant for a reaction of zero order reaction in A is 0.0030mol$L^{-1}s^{-1}$.How long will it take for the intial concentration of A to fall from 0.10 M to 0.075M?
20. Derive the Integrated rate equation for first order reaction. Find half life period and plot the graph associated to it. **[2008]**
21. A first order reaction has a rate constant 1.15 x 10^{-3} s^{-1}. How long will 5 g of this reactant take to reduce to 3 g?
22. The thermal decomposition of HCOOH is a first order reaction with a rate constant of 2.4 x $10^{-3}s^{-1}$ at a certain temperature .Calculate how long it will take for the three-fourths of initial quantity of HCOOH to decompose.**[2011]**
23. A first order reaction is found to have a rate constant. k = 5.5 x 10^{-4} s^{-1} . Find the half-life of the reaction.
24. Show that in a first order reaction, time required for completion of 99.9% is 10 times of half-life ($t_{1/2}$) of the reaction.
25. For a first order reaction, show that time required for 99% completion is twice the time required for the completion of 90% of reaction.

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26. The half-life for radioactive decay of ^{14}C is 5730 years. An archaeological artifact containing wood had only 80% of the ^{14}C found in a living tree.Estimate the age of the sample. **[2008]**
27. The rate constant for a first order reaction is 60 s^{-1}. How much time will it take to reduce the initial concentration of the reactant to its $1/10^{th}$ value? **[2007]**
28. A first order reaction takes 40 min for 30% decomposition. Calculate $t_{1/2}$. **[2008]**
29. A first order reaction has a rate constant $0.0051min^{-1}$ .If we begin with 0.10 M concentration of the reactant ,what concentration of the reactant will be left after 3 hours. **[2009]**
30. Sucrose decomposes in acid solution into glucose and fructose according to the first Order rate law, with $t1/2$ = 3.00 hours. What fraction of sample of sucrose remains after 8 hours? **[CBSE sample paper]**
31. The decomposition of phosphine PH_3 proceeds according to the following equation: $4PH_3 \rightarrow P_4 + 6H_2$,It is found that the reaction follows rate reaction rate=K[PH_3] The half life of PH_3 is 37.9 secondsat 120°C. (i)How much time is required for $3/4^{th}$ of PH_3 to decompose? (ii)What fraction of the original sample of PH_3 remains behind after 1 minute? **[2010]**
32. Mention the factors that affect the rate of a chemical reaction. **[2008]**
33. Define Pseudounimolecular reaction with an example, **[2011C]**
34. .The rate of a reaction quadruples when the temperature changes from 293 K to 313 K. Calculate the energy of activation of the reaction assuming that it does not change with temperature. ($R=8.314JK^{-1}mol^{-1}$)
35. The rate of reaction increases four times when the temperature changes from 300 K to 320 K. Calculate the energy of activation of the reaction assuming that it does not change with temperature.($R=8.314JK^{-1}mol^{-1}$) **[2010]**
36. The rate of chemical reaction doubles for an increase of 10 K in absolute temperature from 298K. Calculate Ea.
37. The rate constants of a reaction at 650K and 700K are $2.15 \times 10^{-8}Lmol^{-1}s^{-1}$ and $2.39 \times 10^{-7}Lmol^{-1}s^{-1}$ respectively. Calculate the values ofActivation energy.**[2009]**
38. The first order rate constant for the decomposition of ethyl iodide by the reaction $C_2H_5I(g) \rightarrow C_2H_4(g) + HI(g)$ at 600K is $1.60 \times 10^{-5}\ s^{-1}$. Its energy of activation is 209 kJ/mol. Calculate the rate constant of the reaction at 700K.
39. **Define the terms : (i) Threshold Energy (ii) Activated Complex (iii) Activation energy[2009,2011]**
40. **Explain the Effect of Catalyst on activation energy. [CBSE sample paper]**
41. **Write a note on Collision Theory of Chemical Reactions.**
42. For a certain chemical reaction A + 2B → 2C + D.The experimentally obtained information is tabulated below.

Experiment	[A]0	[B]0	Initial rate
1	0.30	0.30	0.096
2	0.60	0.30	0.384
3	0.30	0.60	0.192
4	0.60	0.60	0.768

(i)Derive the order of reaction w.r.t. both the reactants A and B. (ii) write the rate law.(iii) calculate the value of rate constant k (iv) Write the expression for the rate of reaction in terms of A and C. **[CBSE sample paper]**

असफलता एक चुनौती है, इसे स्वीकार करो, क्या कमी रह गई, देखो और सुधार करो।
जब तक न सफल हो, नींद चैन को त्यागो तुम, संघर्ष का मैदान छोड़ कर मत भागो तुम।
कुछ किये बिना ही जय जय कार नहीं होती, कोशिश करने वालों की कभी हार नहीं होती।

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