Quarterly Examination 2018-2019
CHEMISTRY

Class - XII

Time : 2Hrs.+15mins. **Full Marks : 70**

[Question 1 is of 20 marks and all questions are compulsory. Question 2 to 8 carry 2 marks each with the questions having internal choices. Question 9 to 15 carry 3 marks each with the questions having internal choices. Question 16 to 18 carry 5 marks each and all of them have internal choices.]

Part - I (20 marks)
[Answer all questions]

Q1.a) Fill in the blanks by choosing the appropriate word/ words from those given in the brackets: [4x1=4]

[Less, KCN, AgCN, +3, more, +2, S^{-1}, $molL^{-1}$, 6, mol L^{-1} S^{-1}, PBr_3, 4, HBr]

(i) For the first order reaction, the unit of rate is _____ and that of rate constant is _____.

(ii) RCH_2OH reacts with_____to give RCH_2Br and RCH_2Br on reaction with_____ gives RCH_2CN.

(iii) Van't Hoff factor of acetic acid solutions is_____ that one and the value of normal colligative property is _____ than the observed colligative property of this solution.

(iv) The oxidation number of Co in $[CoBr_2(en)_2]^+$ is _____ and the coordination number of cobalt is _____ .

b) Complete the following statements by selecting the correct alternatives from the choices given :— [4]

{Turn Over}

(i) When phenol is treated with excess of bromine water it gives :

(a) m-bromophenol

(b) o, p bromophenol

(c) 2,4 dibromophenol

(d) 2,4,6 tribromo phenol.

(ii) When 0.1 mole urea is dissolved in 9.9 mole of water, then the vapour pressure is :

(a) Increased by 1%

(b) Decreased by 1%

(c) Increased by 10%

(d) Decreased by 10%.

(iii) Heating Cu_2O and Cu_2S will give

(a) $Cu + SO_2$ (b) $Cu + SO_3$

(c) Cu + Cus d) Cu_2SO_3

(iv) Which one of the following reaction is a method for the conversion of a ketone into a hydrocarbon ?

a) Aldol condensation

b) Reimer - Tiemann reaction

c) Cannizzaro reaction

d) Wolff - kishner reduction

c) Answer the following questions :— [4x2=8]

(i) a) C — x bond length in CH_3 X is longer than C — X bond length of C_6H_5X. — Explain.

b) $CH_3CHO + CH_3Mg\ X \xrightarrow[H_2O]{H^+} A + B$ Identify A and B.

Identify A and B.

(ii) a) Ozone acts are powerful oxidising agent — Explain.

b) Write balanced equation when acidified potassium dichromate reacts with KI.

(iii) $[CoF_6]3^-$ is a coordination complex ion.

(a) What is the oxidation number of cobalt in the complex ?

(b) How many unpaired electrons are there in the complex ?

(c) State the magnetic behaviour of the complex.

(d) Give IUPAC name of the ion. [Co = 27].

(iv) For reaction A+B $\longrightarrow$ C+D. If concentration of A is doubled without altering that of B, rate doubles. If concentration of B is increased nine time without altering that of A, rate triples. What is the order of reaction ?

d) Match the following : **[4]**

(i) Anhydrous $ZnCl_2$ + Conc HCl	(a) Schiff's reagent.
(ii) Alkyl halide and sodium alkoxide	(b) K Kg mol^{-1}
	(c) Williamson synthesis
(iii) Molal depression constant	(d) mol L^{-1} S^{-1}.
(iv) Rate of reaction	(e) Lucas reagent

Part - II

Q2. The slope of the line in the graph of log K (K = rate constant) versus $\frac{1}{T}$ is — 5841. Calculate the activation energy of the reaction.

OR

The rate of first order reaction is 1.5×10^{-2} $molL^{-1}$ min^{-1}. at 0.5 M concentration of the reactant. What is the half - life of the reaction ?

Q3. How will you prepare phenol from

(i) benzene diazonium chloride and

(ii) chlorobenzene. Give balanced equations.

Q4. Identify the products A, B, C, D.

$$C_6H_6 \xrightarrow[\text{Anhydrous } AlCl_3]{CH_3Cl} A \xrightarrow[CCl_4]{CrO_2Cl_2} B \xrightarrow[NaOH]{\text{Conc;}} C + D$$

OR

$$CH_3-\overset{\overset{O}{\|}}{C}-Cl \xrightarrow[\text{Dryether}]{(CH_3)_2\,Cd} A \xrightarrow[H^+]{NH_2\,OH} B$$

$$A \xrightarrow{I_2^+\ NaOH} C \xrightarrow[+\ 3\ KOH]{CH_3\,NH_2} D$$

Q5. Give reasons :

(i) Glycol and water is used in car radiators in cold country.

(ii) Rate of reaction increases with rise in temperature.

Q6. Distinguish between :

(i) Propan — 2 — Ol and 2 — methyl propan — 2 — 0*l*.

(ii) Acetaldehyde and benzaldehyde.

Q7. Write balanced equations for the following :

(i) When acetaldehyde reacts with dil NaOH.

(ii) When chloroform is condensed with acetone (in presence of KOH).

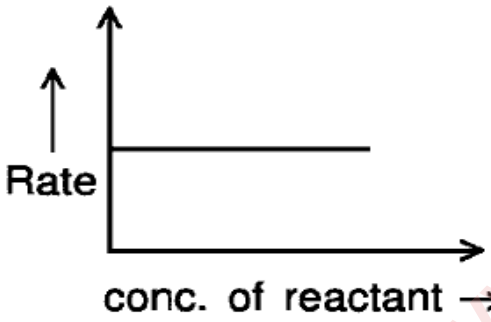
Q8. Account for the following :—

(i) Order of reactivity of alcohols involving cleavage of C—O bond is tertiary>Secondary>Primary.

(ii) Why is boiling point of butanal is much lesser than boiling point of butanol ?

Q9. a) The osmotic pressure of a dilute aqueous solution of a compound x containing 0.12 g/L is twice the osmotic pressure of a dilute aqueous solution of another compound Y containing 0.18 g/L. What is the ratio of the molecular weight of X to that of Y ?

b)



From the figure, state

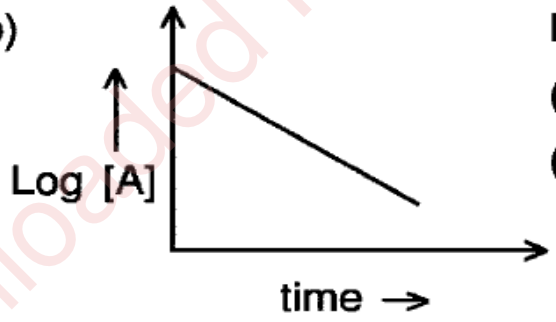
(i) the order of reaction

(ii) Unit of rate constant for the reaction.

OR

a) The vapour pressure of a pure liquid A at 300 K is 150 torr. The vapour pressure of this liquid in a solution with liquid B is 105 torr. Calculate the mole fraction of B if the mixture obeys Raoult's law.

b)



From the figure state :

(i) the order of reaction

(ii) Unit of rate constant for the reaction.

Q10. Write the balanced equations for the following named reactions :—

(i) Kolbe's reaction

(ii) Clemmensen reduction

(ii) Crossed Cannizzaro's reaction.

Q11. Write IUPAC names of the following complex compounds :-

(i) $[Pt\ (NH_3)_5\ Cl]\ Br_3$ (ii) $K_3\ [Fe\ (C_2O_4)_3]$

(ii) $[Mn\ (H_2O)_6]^{2+}$ (iv) $[Co\ (NH_3)_5\ (—ONO)]Cl_2$

(v) $[Cr\ (CO)_6]\ [Co\ (CN)_6]$ (vi) $[Co\ Br_2\ (en)_2]^+$

Q12. In the extraction of zinc :

(i) Name the major ore

(ii) Give reactions for the extraction process

(iii) Name the process of refining of metal.

OR

In the extration of silver :—

(i) Name the major ore

(ii) Give reactions for extraction process.

(iii) Name the process of refining of metal.

Q13. Write balanced equations for the following reactions :—

(i) Sulphur dioxide reacts with potassium permanganate.

(ii) Hydrolysis of phosphorus pentachloride.

(iii) Ozone reacts with potassium iodide.

Q14. (i) Rate of reaction triples when the temperature changes from 20^oC to 50^oC. Calculate the energy of activation. [R = 8.314 $JK^{-1}\ mol^+$]

(ii) Henry's law constant of acetone in chloroform is 0.2 bar when the solution is at 308 k. Calculate the vapour pressure of acetone when its mole fraction is 0.14.

Q15. (i) In the reaction $BrO_3^- + 5Br^- + 6H^+ \longrightarrow 3Br_{2(l)} + 3H_2O_{(l)}$. What is the relationship between rate of appearance of Br_2 and rate of disappearance of bromide ions ?

(ii) Write correct order (decreasing) of osmotic pressure of 0.01 (M) aqueous solution of sucrose, . $Mg(NO_3)_2$ and potassium chloride

(iii) Give and example of a zero order reaction.

Q16. (i) In a first order reaction 10% of the reactant in consumed is 25 minutes. Calculate (a) The half-life of the reaction (b) The time required for completing 17% of the reaction.

(ii) A solution of urea in water has boiling point of 100.18°C. Calculate the freezing point of the solution. (K_f of water = 1.86 kkgmol^{-1}, K_b = 0.512 kkg mol^{-1})

OR

(i) The rate constant for the decomposition of hydro carbon is 2.418×10^{-5} s^{-1} at 546 k. If the energy of activation is 179.9 KJ / mol what will be the value of pre-exponential factor ?

b) 0.01 m aqueous solution of $K_3[Fe(CN)_6]$ freezes at — 0.062°C. What is the percentage of dissociation ? (K_f for water = 1.86 kkg mol^{-1})

Q17. (i) Give the structual formula of the following complex compounds :—

a) calcium hexacyanido ferrate (II)

b) mercurytetrathiocyanatocobaltate (II)

c) tetraaquaplatinum (II) telrachloridoplatinate (II)

d) potassiumtetracyanidonickelate (O).

(ii) Draw the structure of (i) dichromate ion (ii) Geometrical isomers of $[Cr(C_2O_4)_2Cl_2]3^-$

OR

(i) Account for the following :

a) Mercury loses its meniscus when ozone gas is passed through it.

b) Phosphorus can form its pentahalide but nitrogen can not.

c) SO_2 exhibits bleaching action only in presence of water.

(ii) What type of structural isomers are $[Pt\ (NH_3)_3NO_2]$ Br and $[Pt\ (NH_3)_3Br]\ NO_2$?
Give one test to distinguish the isomers.

Q18. (i) An organic compound A (C_7H_8) on oxidation by chromyl chloride in presence of CCl_4 gives a compound B which gives positive Tollen's test. The compound B gives two products, C and D when treated with NaOH followed by hydrolysis. C, on oxidation gives B which on further oxidation gives D. The compound D on heating with sodalime gives a hydrocarbon E. The compound E when treated with conc. HNO_3 in presence of conc. H_2SO_4 below 60°C. gives a compound F. Identify the compounds A, B, C, D, E and F. Write balanced equation for conversion of D to E.

(ii) What do you observe when phenol is treated with benzene diazonium chloride.

OR

(i) Carry out the following conversions :-

(a) Ethyle chloride to methyl chloride.

(b) Ethanol to acetone.

(c) Phenol to toluene

(d) Aniline to bromobenzene.