

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, $\text{mol L}^{-1} S^{-1}$, 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 $[\text{CoBr}_2(\text{en})_2]^+$ 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) $\text{Cu} + \text{SO}_2$ (b) $\text{Cu} + \text{SO}_3$
- (c) $\text{Cu} + \text{CuS}$ (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_3X is longer than C — X bond length of $\text{C}_6\text{H}_5\text{X}$. — Explain.

b) $\text{CH}_3\text{CHO} + \text{CH}_3\text{MgX} \xrightarrow[\text{H}_2\text{O}]{\text{H}^+} \text{A} + \text{B}$ Identify A and B.
Identify A and B.

(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.

- c) tetraaquaplatinum (II) tetrachloridoplatinate (II)
 d) potassiumtetracyanonickelate (O).
- (ii) Draw the structure of (i) dichromate ion (ii) Geometrical isomers of $[\text{Cr}(\text{C}_2\text{O}_4)_2\text{Cl}_2]^{3-}$

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 $[\text{Pt}(\text{NH}_3)_3\text{NO}_2]$ Br and $[\text{Pt}(\text{NH}_3)_3\text{Br}]\text{NO}_2$?
 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) a) Ozone acts are powerful oxidising agent — Explain.
 b) Write balanced equation when acidified potassium dichromate reacts with KI.
- (iii) $[\text{CoF}_6]^{3-}$ 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 $\text{A} + \text{B} \longrightarrow \text{C} + \text{D}$. 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) $\text{mol L}^{-1} \text{S}^{-1}$. |
| (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.

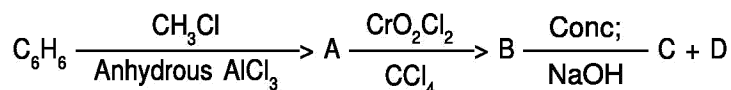
OR

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

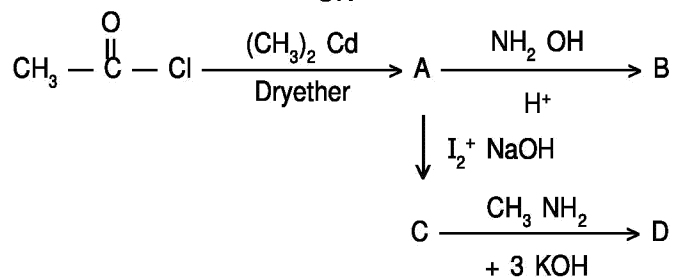
Q3. How will you prepare phenol from

- benzene diazonium chloride and
- chlorobenzene. Give balanced equations.

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



OR



Q5. Give reasons :

- Glycol and water is used in car radiators in cold country.
- Rate of reaction increases with rise in temperature.

Q6. Distinguish between :

- Propan — 2 — Ol and 2 — methyl propan — 2 — Ol.
- Acetaldehyde and benzaldehyde.

Q7. Write balanced equations for the following :

- When acetaldehyde reacts with dil NaOH.
- When chloroform is condensed with acetone (in presence of KOH).

Q15. (i) In the reaction $\text{BrO}_3^- + 5\text{Br}^- + 6\text{H}^+ \longrightarrow 3\text{Br}_{2(l)} + 3\text{H}_2\text{O}_{(l)}$. 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, $\text{Mg}(\text{NO}_3)_2$ and potassium chloride

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

Q16. (i) In a first order reaction 10% of the reactant is consumed in 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 = $1.86 \text{ kkg mol}^{-1}$, $K_b = 0.512 \text{ kkg mol}^{-1}$)

OR

(i) The rate constant for the decomposition of hydrocarbon is $2.418 \times 10^{-5} \text{ s}^{-1}$ 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 $\text{K}_3[\text{Fe}(\text{CN})_6]$ freezes at -0.062°C . What is the percentage of dissociation ? (K_f for water = $1.86 \text{ kkg mol}^{-1}$)

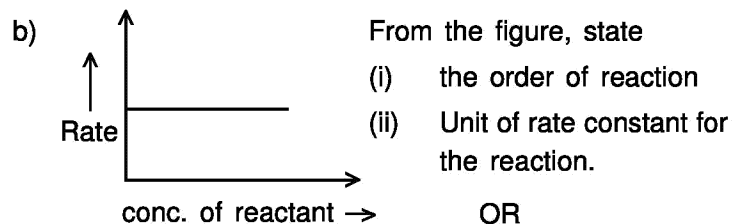
Q17. (i) Give the structural formula of the following complex compounds :—

- calcium hexacyanido ferrate (II)
- mercurytetrathiocyanatocobaltate (II)

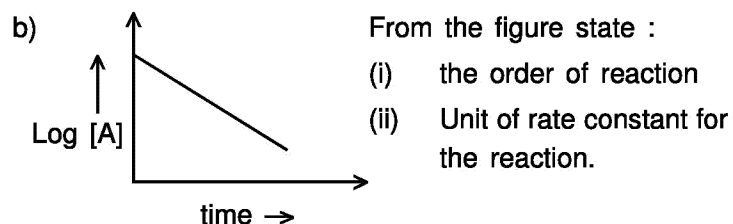
Q8. Account for the following :—

- (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 ?



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.



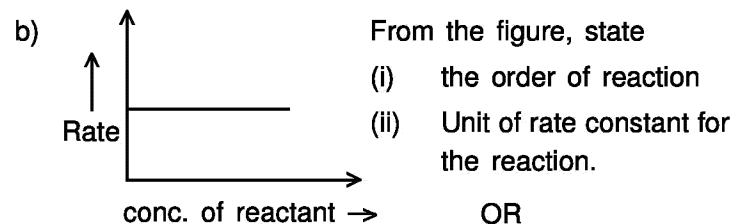
Q10. Write the balanced equations for the following named reactions :—

- (i) Kolbe's reaction
- (ii) Clemmensen reduction
- (ii) Crossed Cannizzaro's reaction.

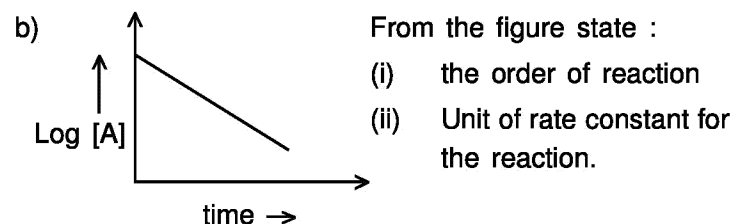
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- (i) $[\text{Pt}(\text{NH}_3)_5\text{Cl}]\text{Br}_3$ (ii) $\text{K}_3[\text{Fe}(\text{C}_2\text{O}_4)_3]$
(iii) $[\text{Mn}(\text{H}_2\text{O})_6]^{2+}$ (iv) $[\text{Co}(\text{NH}_3)_5(\text{ONO})]\text{Cl}_2$
(v) $[\text{Cr}(\text{CO})_6][\text{Co}(\text{CN})_6]$ (vi) $[\text{CoBr}_2(\text{en})_2]^+$

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 extraction of silver :—

- (i) Name the major ore
(ii) Give reactions for extraction process.
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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°C to 50°C . Calculate the energy of activation. $[R = 8.314 \text{ JK}^{-1} \text{ mol}^{-1}]$

- (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.

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