(c) Benzene to m-nitro benzoic acid .

(d) Methanol to ethanol.

OR

(i) Give a chemical test to distinguish between dimethyl ether and ethyl alcohol.

(ii) An organic compound A(C_2H_7N) on reaction with nitrous acid gives a compound B. B on controlled oxidation gives a compound C. C reduces Tollen's reagent. To produce silver mirror and D. On warming B with D in presence of conc. H_2SO_4 gives a sweet smelling compound E. Identify A,B,CD and E. Give the reaction of C with ammonia.

Half Yearly Examination - 2018-19

CHEMISTRY

Class : XII

Time : 3 Hrs. + 15 min **Full Marks : 70**

(Questions 1 is of 20 marks and all questions are compulsory . Q.2 to 8 carry 2 marks each with two questions having internal choices. Q.9 to 15 carry 3 marks each with two questions having internal choices. Q.16 to 18 carry 5 marks each and all of them have internal choices.)

Part 1 (20 marks)

(Answer all questions)

Q1. a) Fill in the blanks by choosing the appropriate word/words from those given in the bracket: (4)

[Fluorine, Eectrophoresis, HI, HF, Osmosis, less, more, chlorine, elevation, directly, inversely, Tyndall effect, depression]

(i) The halogen which has the highest value of bond dissociation energy is _____ and the strongest reducing agent among the hydrides of group 17 is_____

(ii) Aniline is _____ basic than ammonia whereas ethyl amine is _____ basic than ammonia.

(iii) The movement of collodial particles under the influence of an electric field is called_____ and scattering of light by colloidal particle is called ___

(iv) The _____of the boiling point of a solvent by the addition of a solute is _____ proportional to the molality of the solution.

(B) Complete the following sentences by selecting the correct alternations from the choices given: (4)

(i) In a solid lattice the cations has left the lattice site and is located in an interstitial position, the lattice defect is:

a) Interstitial defect b) Valency defect

c) Frenkel defect d) Schottky defect.

(ii) In XeF_2, Xe involves the hybridization:

A) Sp b) Sp^2

c) Sp^3d d) Sp^3

(iii) The product formed were amiline is warmed with chloroform and caustic potash is -

a) Phenyl is chloride b) Methyl isocyanine

c) Phenyl isocyanine d) Nitro phenol.

(iv) Which of the following does not undergo Cannizaro's reaction?

a) Benzaldehyde b) 2-methyl propanal

c) P-methoxy benzaldehyde

d) 2,2 dimethyl propanal.

C) Answer the following questions : (4X 2=8)

(i) In a cubic type unit cell, atoms of A are at the centre and corners of the cube, Atoms of B are at one half faces of the cube. What is the simplest formula of the compound?

(ii) Fluorine provides the largest number of interhalogens compounds among halogens – Explain. Draw the shape of IF_5.

(iii) What is the freezing point (^oC) of solution containing 0.1g of K_3 [Fe (cn)$_6$] (mol. wt. = 329) in 100g of water (Kf = 1.86 mol)

(iv) Oxygen is available in air yet fuels do not burn by themselves at room temperature – explain.

17. (i) Write balanced equation for the following reactions :-

a) Sulphur dioxide reacts with chlorine and water.

b) Chlorine reacts with excess ammonia.

c) Ozone reacts with lead sulphide.

(ii) Give evidence that $[Co(NH_3)_5Cl]\ SO_4$ and $[Co(NH_3)_5\ SO_4]\ Cl$ ionisation isomers.

(iv) Draw the structure of $XeOF_2$.

Or

(i) Draw geometrical isomers of $[Pt\ (en)_2\ Cl_2]^{2+}$.

(ii) In the extraction of iron, give the reactions for

(a) Zone of combustion

(b) Zone of fusion and

(c) Zone of slag formation.

(iii) Draw the structure of $XeOF_4$.

18. (i) Carry out the following conversations:-

(a) Ethyl amine to methyl amine.

(b) Benzene to phenol.

15. Answer the following Questions :

(i) 0.1 M urea solution shows less depression in freezing point that O.IM Mg Cl_2 solution explain.

(ii) Why is ferric chloride preferred over potassium chloride in case of cut leading to bleeding?

(iii) Fe_2O_3 is an antiferromagnetic substance. What is its magnetic moment? Why?

16. (i) Give reason:- leather gets hardened after tanning.

(ii) When sodium chloride is heated in an atmosphere of sodium vapors, it gives yellow colour. Name the type of defect in the crystal and give reason for the colour?

(iii) Depression in freezing point of 0.1 molal solution of HF is – 0.201°C. Calculate percentage degree of dissociation of HF (K_f = 1.86 kg mol^{-1}).

(iv) In a first order reaction A ---> B, if K is rate constant and the initial concentration of the reactant is A= 0.5M, Then the half life is –

a) $\frac{\log 2}{K}$ b. $\frac{\ln 2}{K}$ c. $\frac{\log 2}{K\sqrt{0.5}}$ d. $\frac{0.693}{0.5\,K}$

OR

(i) What happens when gelatin is mixed with gold sol?

(ii) Gold crystallizes is F.C.C structure. What is the length of a side of the cell?

(Radius = 0.144nm.)

(iii) a) When 1 mole of $CrCl_3 .6H_2O$ is treated with excess $AgNO_3$, 3 moles of AgCl are obtained. What is the formula of the complex compound?

b) Write balanced equation for the reaction when acidified potassium permanganate reacts with hydrogen sulphide.

(iv) Complete the following reactions:

a) $C_2H_5NH_2 + CH_3COCl$ ----> _____ + _____

b) $C_6H_5CH_3$ + alk $KMnO_4$ ---> __ + NaOH&CaO ---> __ (4)

D. Match the following:

a)	Ammoniacal silver nitrate	(i)	Hinsberg's reagent
b)	Purification of colloids	(ii)	$Lmol^{-1}\ sec^{-1}$
c)	Amines	(iii)	sec^{-1}
d)	Second order reaction	(iv)	Tollen's reagent
		(v)	Dialysis
		(vi)	Fehling's solution.

PART 2

Q2. A compound forms hexagonal close-packed structure. What is the total number of voids in 0-5 mol of it? How many are tetrahedral voids?

OR

Potassium crystallizes in a body centered cubic lattice. Calculate the number of unit cells in 1.5g of potassium.
[K = 39u]

Q3. Write balanced equations for the following reactions:-

(i) Ethylamine with nitrous acid.

(ii) Aniline with acetyl chloride.

4. Distinguish between the two compounds:-

   (i) Ethylamine and diethyl amine.

   (ii) Phenol and acetic acid.

   OR

   (i) Benzene and phenol

   (ii) Acetic acid and acetone.

5. Identify A,B,C,& D

   (i) $CH_3COOH \xrightarrow{A} CH_3COCl \xrightarrow{B} CH_3CONH_2$

   $CH_3CONH_2 \xrightarrow{C} CH_3NH_2$

   $CH_3NH_2 \xrightarrow{D} CH_3OH$

6. Arrange the following compounds in increasing order of their basicity:– p-nitro aniline, aniline, p-methyl aniline – give reason for your answer.

7. In a crystal of diamond state (i) the hybridization of carbon atom. (ii) The coordination number of carbon atom. (iii) The type of lattice in which it crystallizes. (iv) The number of carbon atoms present per unit cell.

8. What do you observe when (i) formic acid is added to Tallen's reagent?

   (ii) Alkaline β-naphthol is added to benzene, diazonium chloride?

9. At 300 K, a first order reaction is 50% complete in 20 minutes. At 350 k the same reaction is 50% complete in 5 minutes. Calculate the activation energy of the reaction.

10. Write balanced equations for the following named reactions:

    (i) HVZ reaction (ii) Balz-Schiemann reaction.

    (iii) Wolff-Kishner reaction.

11. a) Write WPAC nomenclature of the following compounds:-

    (i) $Fe_4[Fe(CN)_6]_3$ (ii) $[CoCl_2(en)_2]_2SO_4$

    (iii) $[Co(NH_3)_6]$ $[Cr(CN)_6]$ (iv) $[Zn(OH)_4]^{2-}$

    b) Draw the optical isomers of $[Cr(H_2O)_2(OX)_2]^-$

12. Account for the following:-

    (i) Noble gases have very low boiling point.

    (ii) Fluorine does not play a role of central atom in interhalogen compounds.

    (iii) On being slowly passed through water, PH_3 forms bubbles but NH_3 dissolves

    OR

    (i) ICl is more reactive than I_2.

    (ii) PCl5 cannot act as reducing agent,

    (iii) Noble gases have comparatively large atomic size.

13. Write balanced equations for the following reactions:

    (i) Potassium dichromate reacts with oxalic acid in acidic medium.

    (ii) Chlorine reacts with hot concentrated NaOH.

    (iii) Preparation of phosphine from phosphorus.

14. An element with molar mass 2.7×10^{-2} $kgmol^{-1}$ forms a cubic unit cell with edge length 405 pm, If the density is 2.7×10^3 kgm^{-3}, What is the nature of the cubic cell? What is the packing efficiency of the above crystal?