(ii) Show the mechanism and name it when alkaline hydrolysis of tertiary butyl chloride takes place.

(iii) How will you convert :

a) Acctylene to ethene.

b) Ethane to ethyne.

OR

(i) Show the mechanism and name it when rate = K [Alkylhalide] [OH^-] is followed.

(ii) Name the free radicals when methyl chloride undergoes heterolytic fission.

(iii) Complete the following reactions :

a) $3\ C_2H_2 \xrightarrow[773k]{Cu} A.$

b) $CH_3 - CH = CH_2 \xrightarrow[R\text{-}O\text{-}O\text{-}R]{HCl} B$

c) $H_3C - CH_2 - CH = CH_2 \xrightarrow[Zn/H_2O]{O3} C + D + H_2O_2$

Half Yearly Examination 2018-2019
Chemistry

Class : XI

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

[Question 1 is of 20 marks having four sub-parts, all of which are compulsory. Question No. 2 to 8 carry 2 marks each having two internal choices. Q. 9 to 15 carry 3 marks each having two internal choices. Q. 16 to 16 carry 5 marks each all of which has internal choices.]

Part - I

Q1. (a) Fill in the blanks :- **[4]**

(i) Among group 13 elements the liquid metal is _____ and the only non-metal is _____.

(ii) Ozonolysis product of $CH_3 - \underset{\underset{CH_3}{|}}{C} = \underset{\underset{H}{|}}{C} - CH_3$ followed by hydrolysis gives _____ and _____

(iii) Volume occupied by 1 molecule of water (density = 1g/cm3) is _____.

(iv) Electronic configuration of Mn^{4+} is _____ and number of unpaired electrons are _____. [Mn = 25]

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

(i) Which of the following pairs of hybridisation and corresponding angles are correct ?

(a) SP^3, 90^O (b) SP^2 , 120^O (c) SP^2, 180^O

{Turn Over}

(ii) The first ionisation enthalpies of Na, Mg and Al are in the order :-

(a) Na > Mg > Al (b) Na < Mg > Al

(c) Na < Mg < Al.

(iii) Which of the following carbocations will be the most stable ?

(a) $Ph_3\ C^{(+)}$ (b) $H_2C = CH - \overset{(+)}{C}H_2$

(b) $(CH_3)_2\ \overset{(+)}{C}H$

(iv) Which of the following is Lewis acid ?

(a) Ammonia (b) Borontri fluoride

(c) Borax

C. Match the following : [4]

(i)	Nucleophiles	(a)	Unsaturated hydrocarbons.
(ii)	Plaster of Paris	(b)	Electron deficient system.
(iii)	$Br_2 + CCl_4$	(c)	Lithium
(iv)	Forms superoxides	(d)	Electron rich system.
		(e)	$CaSO_4 . ½ H_2O$
		(f)	Potassium

d. Answer the following questions :— [4x2=8]

(i) Balance the following reaction by ion-electron method :

$As_2S_3 + NO_3^- \longrightarrow A_sO_4^- + NO + S$ [acidic medium]

(ii) If volume, mass and temperature of two gases H_2

(a) LiF, LiCl, Li Br

(b) $AlCl_3$, NaCl, $CaCl_2$.

(iii) Electron gain enthalpy of chlorine is more than that of fluorine - explain.

Q17. (i) Explain :

a) The relative strength of following acids is $Cl_2CHOOH > ClCH_2COOH > CH_2COOH$.

b) Methyl chloride is more reactive than chloro benzene.

(ii) How will you prepare the following compounds :- [Give reactions]

a) Ethane from acctaldehyde

b) Ethyne from iodoform (CHI_3)

c) Ethene from ethanol.

OR

(i) Write two differences between inductive effect and electromeric effect.

(ii) Draw resonance structures of phenol.

(iii) Ozonolysis of an alkene X following by decomposition with water and a reducing agent gives ethanal and 3-pentanone. What is the structure of alkene X ?

Q18. (i) Identify the types of reactions :-

a) $H_2C = CHCH_2CH_3 \longrightarrow Cl.CH_2 - CH_2CH_3$

b) $CH_3CH_2CH_2Br + OH^- \longrightarrow CH_2 = CH_2$

{Turn Over}

H2O (104.5^{O}) are different although all the molecules have same hybridisation SP^3. — explain.

(ii) Write van-der-waal's equation for real gases. Why is the pressure correction positive ?

Q15. (i) 50ml of hydrogen diffuse through a small hole form a vessel in 20 minutes. What is the time taken for 40 ml of oxygen to diffuse under similar condition ?

(ii) An element x has atomic number 35. State its a) group number b) period number c) Number of unpaired electron/s.

Q16. (i) A gaseous mixture containing 8g of oxygen and 224 ml of nitrogen at STP is enclosed in a flask of 5L capacity at STP. Find the partial pressure of oxygen and nitrogen. Also calculate the total pressure.

(ii) Predict the hybridisations and shape of the following compounds PCl_5, $[Ni(CN)_4]2^-$

(iii) Order of atomic radii in group 13 elements are — B < Al > Ga < In < Tl. Explain.

OR

(i) Pressure of 1g of an ideal gas A at $27^{O}C$ is found to be 2 bar. When 2g of another gas B is introduced in the same flask at same temperature, the pressure becomes 3 bar.

Find the relationship between their molecular masses.

(ii) Arrange the following in decreasing order of melting points :

and O_2 kept in separate vessels are the same, in which vessel the pressure will be greater and how many times?

(iii) Explain with electronic configuration that PCl_5 exists but NCl_5 does not.

(iv) The atomic numbers of three elements A, B and C are Z, (Z+2), (Z+3) respectively. If of these three, B happens to be an inert gas, then :

(i) Which one is most electronegative ?

(ii) Which one has highest ionisation energy ?

(iii) Write the formula of the compound formed by A and C.

(iv) Write the type of bond between A and C.

Part - II

Q2. Draw the molecular orbital diagram of O_2^-. Find the bond order.

OR

Draw the molecular orbital diagram of N_2^+. Find the bond order.

Q3. Equal masses of the two gases A and B are kept in two separate vessels at the same temperature and pressure. If the ratio of the molecular weights of A and B is 2:3, find the ratio of the volums of the two vessels.

Q4. Explain :

(i) Atomic size decreases along period, but at the end of each period atomic size of noble gases increases abruptly.

{Turn Over}

(ii) Aerated bottles are kept under water in summer.

Q5. Classify the following compounds as

(i) having μ = O and (ii) having some net dipole moment.

p — dichlorobenzene, boron trifluoride, cis 1,2 dichloro ethane, sulphur dioxide, carbon di oxide.

Q6. Write a test to distinguish between the two compounds :

(i) Butene and butyne.

(ii) Pent — 1 — yne and pent — 2 — yne.

Q7. Balance the following redox reaction by ion-electron method:

$KMnO_4 + FeSO_4 + H_2SO_4 \longrightarrow Fe_2(SO_4)_3 + MnSO_4 + K_2SO_4 + H_2O$ (acidic medium)

OR

$I^- + MnO_4^- \longrightarrow I_2 + MnO_2$ (Basic Medium)

Q8. Arrange the following in order of property indicated.

(i) Al, Ga, B, In, Tl (increasing ionisation energy)

(ii) $Be(OH)_2$, $Mg(OH)_2$, $Ba(OH)_2$, $Sr(OH)_2$ (Incresasing basic nature)

Q9. Write balanced equations for the following :—

(i) Aluminium sulphate reacts with potassium sulphate solution.

(ii) Magnesium chloride hexahydrate is heated.

(iii) Boron reacts with fused sodium hydroxide.

10. (i) Balance the following reactions by oxidation number method :

(a) $Fe_3O_4 + CO \longrightarrow FeO + CO_2$.

(b) What is the oxidation number of S in $S_2O_8^{2-}$?

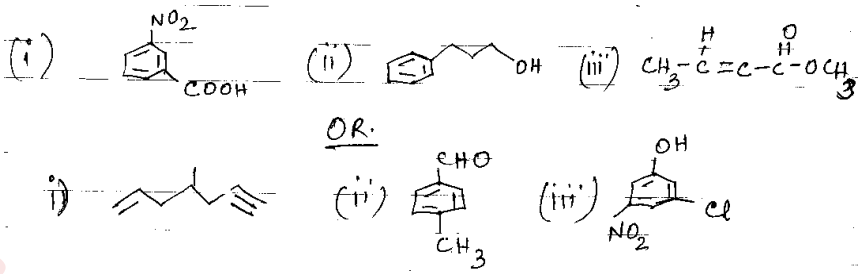
(ii) Inspite of being electron deficient, boron halides of not form dimers.

Q11. Carry out the following conversions :—

(i) Acetylene to methane.

(ii) 1 chloro pr opane to 2 - chloropropane.

Q12. Write IUPAC names of the following compounds :-



Q13. (i) A 100% pure sample of a divalent metal carbonate weighing 2g on complete thermal decomposition releases. 448 cc. of CO_2 at STP. What is the equivalent mass of the metal ?

(ii) Draw the electron dot diagram of $HClO_4$.

OR

i) 0.115 g of a dibasic acid required 25 ml of $^N/_{10}$ NaOH solution for complete neutralisation. Calculate the molecular mass of the acid.

ii) Draw the electron dot diagram of PO_4^{3-} ion.

Q14. (i) The bond angles in CH_4 (109.5^O), NH_3 (107^O) and