Sample Question Paper 2021-22
Term 1
Subject: Chemistry (043)

Time: 90 Minutes Max. Marks: 35

General Instructions:

1. The Question Paper contains three sections.

2. Section A has 25 questions. Attempt any 20 questions.

3. Section B has 24 questions. Attempt any 20 questions.

4. Section C has 6 questions. Attempt any 5 questions.

5. All questions carry equal marks.

6. There is no negative marking.

SECTION A

This section consists of 25multiple choice questions with overall choice to attempt **any 20** questions. In case more than desirable number of questions are attempted, ONLY first 20 will be considered for evaluation.

1.Which of the following statements is true:
(a)Melting point of Phosphorous is less than that of Nitrogen
(b)N_2 is highly reactive while P_4 is inert
(c)Nitrogen shows higher tendency of catenation than P
(d)N-N is weaker than P-P

2. Which of the following is a non-stoichiometric defect?
(a)Frenkel defect
(b)Schottky defect
(c)metal deficiency defect
(d)interstitial defect

3. Identify the law which is stated as:
"For any solution, the partial vapour pressure of each volatile component in the solution is directly proportional to its mole fraction."
(a)Henry's law
(b) Raoult's law
(c)Dalton's law
(d)Gay-Lussac's Law

4. Pink colour of LiCl crystals is due to:
(a) Schottky defect
(b)Frenkel defect
(c) Metal excess defect
(d) Metal deficiency defect

5. Which of the following isomer has the highest meltingpoint:
(a) 1,2-dicholorbenzene
(b) 1,3 -dichlorobenzene
(c) 1,4-dicholorbenzene
(d) all isomers have same melting points

6. Which one of the following reactions is not explained by the open chain Structureof glucose:
(a) Formation of pentaacetate of glucose with acetic anhydride.
(b) formation of addition product with 2,4 DNP reagent
(c) Silver mirror formation with Tollen's reagent
(d) existence of alpha and beta forms of glucose.

7. Williamson's synthesis of preparing dimethyl ether is an:
(a) S_N^1 reaction
(b) Elimination reaction
(c) S_N^2 reaction
(d) Nucleophilic addition reaction

8. Chlorine water loses its yellow colour on standing because:
(a) HCl gas is produced, due to the action of sunlight.
(b) a mixture of HOCl and HCl is produced in the presence of light
(c) HOCl and hydrogen gas is produced
(d) a mixture of HCl and ClO_3 is produced, due to the action of sunlight

9. During dehydration of alcohols to alkenes by heating with concentrated H_2SO_4, the initiation step is:
(a) protonation of alcohol molecule
(b) formation of carbocation
(c) elimination of water
(d) formation of an ester

10. Amorphous solids are:
(a) isotropic
(b)anisotropic
(c) isotopic
(d) isomeric

11. Which of the following reactions is used to prepare salicylaldehyde?
(a) Kolbe's reaction
(b) Etard reaction
(c) Reimer- Tiemann reaction
(d) Stephen's reduction.

12. Which of the following is an example of a solid solution?
(a)sea water
(b)sugar solution
(c)smoke
(d)22 carat gold

13. The boiling points of alcohols are higher than those of hydrocarbons of comparable masses due to:
(a) Hydrogen bonding
(b) Ion – dipole interaction
(c) Dipole- dipole interaction
(d) Van der Waal's forces.

14. Which of the following has the lowest boiling point:
(a)H_2O
(b)H_2S
(c)H_2Se
(d)H_2Te

15. Which of the following statement is correct:
(a)Fibrous proteins are generally soluble in water
(b)Albumin is an example of fibrous proteins
(c)In fibrous proteins, the structure is stabilised by hydrogen bonds and disulphide bonds
(d)pH does not affect the primary structure of protein.

16. Major product obtained on reaction of 3-Phenyl propene with HBr in presence of organic peroxide
(a)3- Phenyl 1- bromopropane
(b) 1 –Phenyl -3- bromopropane
(c) 1-Phenyl -2-bromopropane
(d) 3-Phenyl -2- bromopropane

17. Which of the following is a correct statement for C_2H_5Br?
(a) It reacts with metallic Na to give ethane.
(b) It gives nitroethane on heating with aqueous solution of $AgNO_2$
(c) It gives C_2H_5OH on boiling with alcoholic potash.
(d) It forms diethylthioether on heating with alcoholic KSH.

18.Covalency of nitrogen is restricted to:
(a)2
(b)3
(c)4
(d)5

19.Solubility of gases in liquids decreases with rise in temperature because dissolution is an:
(a)endothermic and reversible process
(b)exothermic and reversible process
(c)endothermic and irreversible process
(d) exothermic and irreversible process

20.All elements of Group 15 show allotropy except:
(a)Nitrogen
(b)Arsenic
(c)Antimony
(d)Bismuth

21.Which of the following is a polysaccharide?
(a)glucose
(b)maltose
(c)glycogen
(d)lactose

22. Substance having the lowest boiling point:
(a)Hydrogen
(b)Oxygen
(c)Nitrogen
(d) Helium

23.Lower molecular mass alcohols are:
(a)miscible in limited amount of water
(b) miscible in excess of water
(c) miscible in water in all proportions
(d) immiscible in water

24.Maximum oxidation state exhibited by Chlorine is:
(a) +1
(b) +3
(c)+5
(d)+7

25.In which of the following cases blood cells will shrink:
(a)when placed in water containing more than 0.9% (mass/ volume) NaCl solution.
(b)when placed in water containing less than 0.9% (mass /volume) NaCl solution.
(c)when placed in water containing 0.9% (mass/volume) NaCl solution.
(d)when placed in distilled water.

SECTION B

This section consists of 24multiple choice questions with overall choice to attempt **any 20** questions. In case more than desirable number of questions are attempted, ONLY first 20 will be considered for evaluation.

26. How much ethyl alcohol must be added to 1 litre of water so that the solution will freeze at– 14°C ? (K_f for water = 1.86°C/mol)
(a) 7.5 mol
(b)8.5 mol
(c)9.5 mol
(d)10.5 mol

27. Which reagents are required for one step conversion of chlorobenzene to toluene?
(a) CH_3Cl / $AlCl_3$
(b) CH_3Cl, Na, Dry ether
(c)CH_3Cl/Fe dark
(d) $NaNO_2$/ HCl /0-5^{0}C

28. On partial hydrolysis, XeF_6 gives:
(a) XeO_3 +4HF
(b) XeO_2F + HF
(c) $XeOF_4$+ H_2
(d) XeO_2F_2 + 4HF

29. Which one of the following statement is correct about sucrose :
(a) It can reduce tollen's reagent however cannot reduce fehling's reagent
(b) It undergoes mutarotation like glucose and fructose
(c) It undergoes inversion in the configuration on hydrolysis
(d) It is laevorotatory in nature .

30. Phenol does not undergo nucleophilic substitution reaction easily due to:
(a) acidic nature of phenol
(b) partial double bond character of C-OH bond
(c) partial double bond character of C-C bond
(d)instability of phenoxide ion

31. Which of the following has highest ionisation enthalpy?
(a)Nitrogen
(b)Phosphorus
(c)Oxygen
(d)Sulphur
32. Metal M ions form accp structure. Oxide ions occupy ½ octahedral and ½ tetrahedral voids. What is the formula of the oxide?
(a)MO
(b)MO_2
(c)MO_3
(d) M_2O_3

33. The reaction of toluene with Cl_2 in presence of $FeCl_3$ gives 'X' while theof toluene with Cl_2in presence of light gives 'Y'. Thus 'X' and 'Y'are:
(a) X = benzyl chloride Y = o and p – chlorotoluene
(b) X = m – chlorotoluene Y = p – chlorotoluene
(c) X = o and p–chlorotoluene Y = trichloromethylbenzene
(d) X= benzyl chloride, Y = m-chlorotoluene

34.Ozone is a/ an _____ molecule and the two O-O bond lengths in ozone are (i)_____-and (ii) _____

(a) linear ,110pm ; 148pm

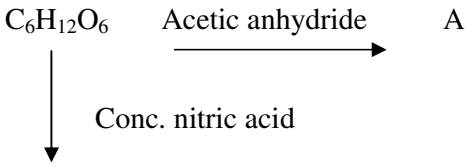
(b) angular, 110pm ; 148pm

(c)linear, 128pm ; 128pm

(d)angular, 128pm ; 128pm

35. Water retention or puffiness due to high salt intake occurs due to:
(a)diffusion
(b)vapour pressure difference
(c) osmosis
(d)reverse osmosis

36. In the following reaction,identify A and B:



(a) A= $COOH\text{-}(CH_2)_4\text{-}COOH$, B= $OHC\text{-}(CHOCOCH_3)_4\text{-}CH_2OCOCH_3$
(b) A= $COOH\text{-}(CH_2)_4\text{-}CHO$, B= $OHC\text{-}(CHOCOCH_3)_4\text{-}CH_2OCOCH_3$
(c) A= $OHC\text{-}(CHOCOCH_3)_3\text{-}CH_2OCOCH_3$ B= $COOH\text{-}(CH_2)_4\text{-}CHO$,
(d) A= $OHC\text{-}(CHOCOCH_3)_4\text{-}CH_2OCOCH_3$ B= $COOH\text{-}(CH_2)_4\text{-}COOH$

37. In lake test for Al^{3+} ions, there is the formation of coloured 'floating lake'. It is due to:
(a)Absorption of litmus by $[Al(OH)_4]^-$
(b)Absorption of litmus by $Al(OH)_3$
(c)Adsorption of litmus by $[Al(OH)_4]^-$
(d) Adsorption of litmus by $Al(OH)_3$

38. A unit cell of NaCl has 4 formula units. Its edge length is 0.50 nm. Calculate the density if molar mass of NaCl = 58.5 g/mol.
(a) 1 g/cm^3
(b)2 g/cm^3
(c) 3 g/cm^3
(d)4g/cm^3

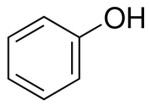
39.Which one of the following are correctly arranged on the basis of the property indicated:
(a)$I_2 < Br_2 < F_2 < Cl_2$ [increasing bond dissociation enthalpy]
(b) $H_2O > H_2S < H_2Te < H_2Se$ [increasing acidic strength]
(c) $NH_3 < N_2O < NH_2OH < N_2O_5$ [increasing oxidation state]
(d) $BiH_3 < SbH_3 < AsH_3 < PH_3 < NH_3$ [increasing bondangle]

40. What would be the reactant and reagent used to obtain 2, 4-dimethyl pentan-3-ol?
(a) Propanal and propyl magnesium bromide
(b) 3-methylbutanal and 2-methyl magnesium iodide
(c) 2-dimethylpropanone and methyl magnesium iodide
(d) 2- methylpropanal and isopropyl magnesium iodide

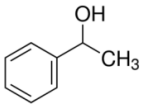
41. o-hydroxy benzyl alcohol when reacted with PCl_3 gives the product as (IUPAC name)
(a) o- hydroxy benzyl chloride
(b) 2- chloromethylphenol
(c) o-chloromethylchlorobenzene
(d) 4-hydroxymethylphenol

42. Which of the following statements is true:
(a)Ammonia is the weakest reducing agent and the strongest base among Group 15 hydrides.
(b) Ammonia is the strongest reducing agent as well as the strongest base among Group 15 hydrides.
(c)Ammonia is the weakest reducing agent as well as the weakest base among Group 15 hydrides.
(d) Ammonia is the strongest reducing agent and the weakest base among Group 15 hydrides.

43.Identify the secondary alcohols from the following set:
(i)$CH_3CH_2CH(OH)CH_3$
(ii) $(C_2H_5)_3COH$
(iii)



(iv)



(a)(i) and (iv)
(b)(i) and (iii)
(c)(i) and (ii)
(d)(i), (iii) and (iv)

44.Alkenes decolourise bromine water in presence of CCl_4 due to formation of:
(a)allyl bromide
(b)vinyl bromide
(c)bromoform
(d)vicinal dibromide

45. Given below are two statements labelled as Assertion (A) and Reason (R)
Assertion (A): Electron gain enthalpy of oxygen is less than that of Flourine but greater than Nitrogen.
Reason (R): Ionisation enthalpies of the elements follow the order Nitrogen > Oxygen > Fluorine
Select the most appropriate answer from the options given below:
(a) Both A and R are true and R is the correct explanation of A
(b) Both A and R are true but R is not the correct explanation of A.
(c)A is true but R is false.
(d) A is false but R is true.

46. Given below are two statements labelled as Assertion (A) and Reason (R)
Assertion (A): Alkyl halides are insoluble in water.
Reason (R): Alkyl halides have halogen attached to sp^3 hybrid carbon.
Select the most appropriate answer from the options given below:
(a) Both A and R are true and R is the correct explanation of A
(b) Both A and R are true but R is not the correct explanation of A.
(c)A is true but R is false.
(d) A is false but R is true.

47. Given below are two statements labelled as Assertion (A) and Reason (R)
Assertion(A): Molarity of a solution changes with temperature.
Reason (R): Molarity is a colligative property.
Select the most appropriate answer from the options given below:
(a) Both A and R are true and R is the correct explanation of A
(b) Both A and R are true but R is not the correct explanation of A.
(c)A is true but R is false.
(d) A is false but R is true.

48. Given below are two statements labelled as Assertion (A) and Reason (R)
Assertion(A):SO_2 is reducing while TeO_2 is an oxidising agent.
Reason(R): Reducing property of dioxide decreases from SO_2 to TeO_2.
Select the most appropriate answer from the options given below:
(a) Both A and R are true and R is the correct explanation of A
(b) Both A and R are true but R is not the correct explanation of A.
(c)A is true but R is false.
(d) A is false but R is true.

49.Given below are two statements labelled as Assertion (A) and Reason (R)
Assertion (A): Cryoscopic constant depends on nature of solvent.
Reason(R): Cryoscopic constant is a universal constant.
Select the most appropriate answer from the options given below:
(a) Both A and R are true and R is the correct explanation of A
(b) Both A and R are true but R is not the correct explanation of A.
(c)A is true but R is false.
(d) A is false but R is true.

SECTION C

This section consists of 6multiple choice questions with an overall choice to attempt any**5.** In case more than desirable number of questions are attempted, ONLY first 5 will be considered for evaluation.

50.Match the following:

I	II
(i)Amino acids	(A)protein
(ii)Thymine	(B)Nucleic acid
(iii)Insulin	(C)DNA
(iv)phosphodiester linkage	(D)Zwitter ion
(v) Uracil	

Which of the following is the best matched options?

(a) i-A, v- D, iii- C, iv-B

(b) i-D, ii-C, iii- A, iv-B

(c) i-D, v- D, iii- A, iv-B

(d) i-A, ii- C, iii- D, iv-B

51. Which of the following analogies is correct:
(a)Nitrogen: $1s^2 2s^2 2p^3$ :: Argon:$1s^2 2s^2 2p^6$
(b)Carbon: maximum compounds :: Xenon: no compounds
(c) XeF_2: Linear :: ClF_3: Trigonal planar
(d)Helium: meteorological observations:: Argon: metallurgical processes

52. Complete the following analogy:
Same molecular formula but different structures: A:: Non superimposable mirror images: B
(a) A:Isomers B: Enantiomer
(b) A: Enantiomers B: Racemic mixture
(c) A: Sterioisomers B: Retention
(d) A: IsomersB: Sterioisomers

CASE1: **Read the passage given below and answer the following questions 53-55**

Early crystallographers had trouble solving the structures of inorganic solids using X-ray diffraction because some of the mathematical tools for analyzing the data had not yet been developed. Once a trial structure was proposed, it was relatively easy to calculate the diffraction pattern, but it was difficult to go the other way (from the diffraction pattern to the structure) if nothing was known *a priori* about the arrangement of atoms in the unit cell. It was important to develop some guidelines for guessing the coordination numbers and bonding geometries of atoms in crystals. The first such rules were proposed by Linus Pauling, who considered how one might pack together oppositely charged spheres of different radii. Pauling proposed from geometric considerations that the quality of the "fit" depended on the **radius ratio** of the anion and the cation.

If the anion is considered as the packing atom in the crystal, then the smaller cation fills interstitial sites ("holes"). Cations will find arrangements in which they can contact the largest number of anions. If the cation can touch all of its nearest neighbour anions then the fit is good. If the cation is too small for a given site, that coordination number will be unstable and it will prefer a lower coordination structure. The table below gives the ranges of cation/anion radius ratios that give the best fit for a given coordination geometry.

Coordination number	Geometry	$\rho = r_{cation}/r_{anion}$
2	linear	0 - 0.155
3	triangular	0.155 - 0.225
4	tetrahedral	0.225 - 0.414
4	square planar	0.414 - 0.732
6	octahedral	0.414 - 0.732
8	cubic	0.732 - 1.0
12	cuboctahedral	1.0

(Source: Ionic Radii and Radius Ratios. (2021, June 8). Retrieved June 29, 2021, from https://chem.libretexts.org/@go/page/183346)

Q53. The radius of Ag^+ ion is 126pm and of I^- ion is 216pm. The coordination number of Ag^+ ion is:
(a)2
(b)3
(c)6
(d)8
Q54. A solid AB has square planar structure. If the radius of cation A^+ is 120pm, calculate the maximum possible value of anion B^-
(a)240 pm
(b)270 pm
(c)280 pm
(d)290 pm

Q55.A “good fit” is considered to be one where the cation can touch:
(a)all of its nearest neighbour anions.
(b) most of its nearest neighbour anions.
(c)some of its nearest neighbour anions.
(d) none of its nearest neighbour anions.

CHEMISTRY (043)
Marking Scheme

SECTION A

1.(d)N-N is weaker than P-P
other statements as incorrect as Phosphorus has a higher melting point due to bigger size than Nitrogen. Nitrogen is inert due to formation of triple bonds and has a lower covalence due to non - availability of d –orbitals

2. (c)metal deficiency defect (anion is missing from lattice site)
In Frenkel defect the smaller ion occupies the interstitial sites and Schottky defect equal number of cations and anions are missing. Interstitial defect an atom or molecule occupies intestinal sites so in these three defects the ratio of positive and negative ions (Stoichiometric) of a solid is not disturbed in these three

3. (b) Raoult's law

4. (c) Metal excess defect (formation of F centres)

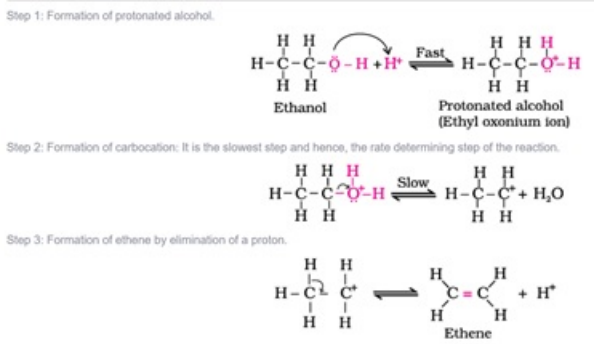
5. (c) 1,4-dicholorbenzene (para isomers are more symmetric and ortho and meta)

6. (d) existence of alpha and beta forms of glucose .

7. (c) S_N2 reaction (alkoxide ion reacts with primary alkyl halide in a single step to form ether)

8. (b) a mixture of HOCl and HCl is produced in the presence of sunlight
$Cl_2(g) + H_2O(l) \rightarrow HCl(g) + HOCl(aq)$

9. (a)protonation of alcohol molecule



10. Amorphous solids are:
(a) isotropic (the value of any physical property is same along any direction)

11. (c) Reimer- Tiemann reaction (Kolbe's reaction is used to prepare salicylic acid, Etard reaction for benzaldehyde, Reimer- Tiemann reaction for salicylaldehyde and Stephen's reduction for aldehyde)

12. (d)22 carat gold (it is an alloy so solid in solid solution)

13. (a) Hydrogen bonding (alcohols form intermolecular hydrogen bonds)

14. (b)H_2S (boiling point increases down the group but water forms strong hydrogen bonds so has higher boiling point than H_2S)

15. (d)pH does not affect the primary structure of protein (pH effects the tertiary structure)

16. (b) 1 –Phenyl -3- bromopropane
($(C_6H_5)CH_2CH=CH_2$ + HBr (organic peroxide) → $(C_6H_5)CH_2CH_2CH_2Br$ anti-Markovnikov addition)

17. (b) It gives nitroethane on heating with aqueous solution of $AgNO_2$
(C_2H_5Br reacts with metallic Na to give butane , gives ethene on boiling with alcoholic potash. and forms C_2H_5SH (thiol) on heating with alcoholic KSH)

18. (c)4 (Covalency of nitrogen is restricted to 4 due to non availability of d orbitals)

19. (b)exothermic and reversible process (according to Le -Chatlier principle Solubility of gases in liquids decreases with rise in temperature)

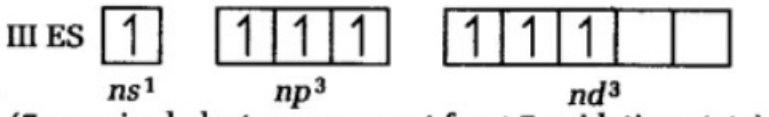
20. (a)Nitrogen (due to small size and high electronegativity N-N is weak)

21.(c)glycogen (It is a polymer of glucose)

22. (d) Helium (He is monoatomic and has low atomic mass)

23.(c) miscible in water in all proportions Lower molecular mass alcohols are able to form hydrogen bonds with water

24.(d)+7 (Cl : $1s^2 2s^2 2p^6 3s^2 3p^5$)



(7 unpaired electrons account for +7 oxidation state)

25.(a)When placed in water containing more than 0.9% (mass/ volume) NaCl solution because fluid inside blood cells is isotonic with 0.9% NaCl solution

SECTION B

26. (a) 7.5 mol

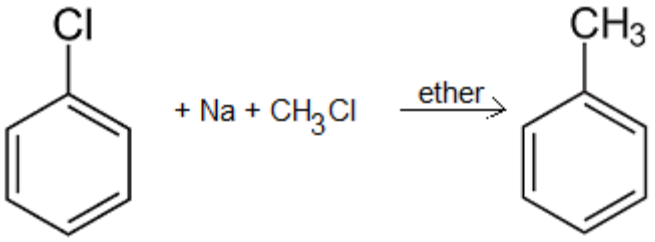
$\Delta T_f = K_f\, m$

$\Delta T_f = K_f \dfrac{n_2 \times 1000}{w_1}$

$14 = 1.86 \times \dfrac{n_2 \times 1000}{1000}$

$n_2 = 7.5$ mol

27. (b) CH_3Cl, Na, Dry ether



Chlorobenzene Toluene

28. (d) $XeO_2F_2 + 4HF$

$XeF_4 + H_2O \rightarrow XeO_2F_2 + 4HF$

29. (c) It undergoes inversion in the configuration on hydrolysis

30. (b) partial double bond character of C-OH bond

31. (a)Nitrogen (High IE of N is because of smallest size in the group and completely half - filled p subshell)

32. (d) M_2O_3

Metal M ions form ccp structure. Let number of ions of M be : X

No. of tetrahedral voids = 2x

No. of octahedral voids = x

Number of oxide ions will be 1/2 x + ½ (2x) = 3/2 x

Formula of oxide = MxO3/2 x = M_2O_3

33. c) X = o and p–chlorotoluene Y = trichloromethylbenzene

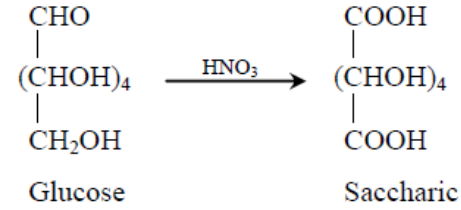
The reaction of toluene with Cl_2 in presence of $FeCl_3$ gives 'X' due to electrophilic substitution reaction taking place at ortho and para positions and reaction in the presence of light gives 'Y', due to substitution reaction occurring via free radical mechanism

. Thus 'X' and 'Y'are X = o and p–chlorotoluene Y = trichloromethylbenzene

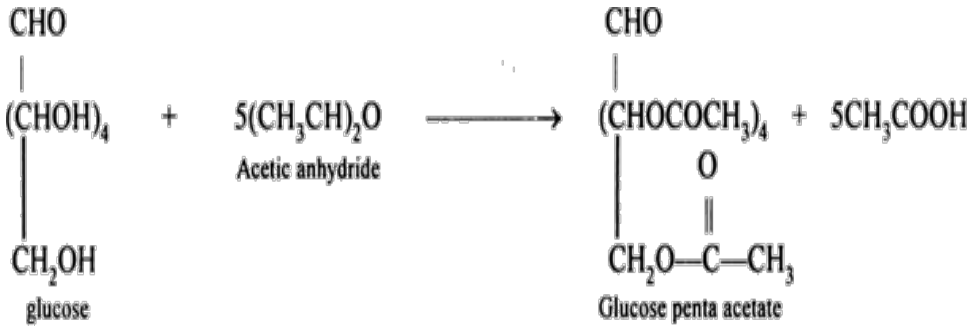
34. (d)angular, 128pm ; 128pm (Ozone is a resonance hybrid of two equivalent structures)

35. (c) Osmosis

36. d) A= OHC-$(CHOCOCH_3)_4$-CH_2OCOCH_3 B= COOH-$(CH_2)_4$ -COOH



Glucose Saccharic acid



37. (d) Adsorption of litmus by $Al(OH)_3$
In lake test for Al^{3+} ions, there is the formation of coloured 'floating lake' In lake test for Al^{3+} ions, there is the formation of coloured 'floating lake' due to adsorption

38. (c) 3 g/cm^3
Using formula

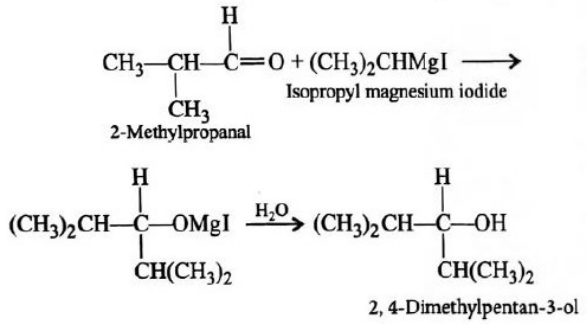
$$\text{Density} = \frac{(Z \times m)}{(a^3 \times Na)}$$

$$D = \frac{4 \times 58.5}{(0.5\times10^{-7})^3 \times 6.023\times10^{23}}$$

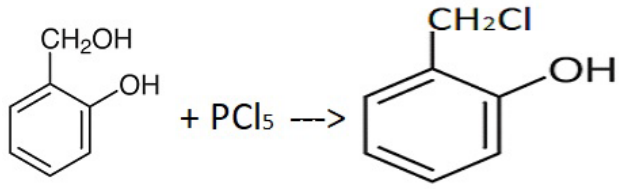
$= 3.1\ g/cm^3$

39. **(d)** $BiH_3<SbH_3<AsH_3<PH_3<NH_3$ [increasing bond angle] correct order
(a) $I_2 < Br_2<F_2<Cl_2$ [increasing bond dissociation enthalpy]: incorrect order , correct order is $Cl_2 > Br_2 > F_2 > I_2$.
(b) $H_2O > H_2S<H_2Te<H_2Se$ [increasing acidic strength]: incorrect order , correct order is
$H_2O<H_2S<H_2Se<H_2Te$
(c) $NH_3 < N_2O< NH_2OH<N_2O_5$ [increasing oxidation state] : incorrect order NH_3 (Oxidation state -3) N_2O (Oxidation state +1) NH_2OH(Oxidation state -1) N_2O_5 (Oxidation state +5)

40. (d) 2- methylpropanal and isopropyl magnesium iodide

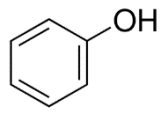


41. (b) 2- chloromethylphenol

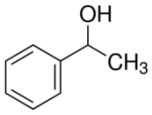


42. (a)Ammonia is the weakest reducing agent and the strongest base among Group 15 hydrides. The reducing character of hydrides increases down the group due to decrease in bond dissociation enthalpy.

43 (a)(i) and (iv)
(i)$CH_3CH_2CH(OH)CH_3$ (secondary) (ii) $(C_2H_5)_3COH$ (tertiary)
(iii) (iv)



Phenol not an alcohol



secondary

44. (d)vicinal dibromide
$CH_2=CH_2 + Br_2 \rightarrow BrCH_2 - CH_2Br$

45. **(c)**
Assertion: Electron gain enthalpy of oxygen is less than that of Flourine but greater than Nitrogen. (correct)
Reason: Ionisation enthalpies of the elements follow the order Nitrogen > Oxygen > Fluorine (incorrect)
Ionisation enthalpies of the elements follow the order Fluorine >Nitrogen > Oxygen

46. (b) **Assertion:** Alkyl halides are insoluble in water. (correct)
Reason: Alkyl halides have halogen attached to sp^3 hybrid carbon. (correct)
Alkyl halides are insoluble in water because they are unable to form hydrogen bonds with water or break pre-existing hydrogen bonds.

47. (c)**Assertion:** Molarity of a solution changes with temperature. (correct)
Reason: Molarity is a colligative property. (incorrect)
Molarity is a means to express concentration. It is not a physical property.

48. (a) **Assertion:** SO_2 is reducing while TeO_2 is an oxidising agent. (correct)
Reason: Reducing property of dioxide decreases from SO_2 to TeO_2 (correct and reason for Assertion)

49. (c) **Assertion:** Cryoscopic constant depends on nature of solvent. (correct)
Reason: Cryoscopic constant is a universal constant (incorrect)
Cryoscopic constant various with type of solvent

SECTION C

50. (b) i-D, ii-C, iii- A, iv-B
Amino acids form proteins and exist as zwitter ion , Thymine is a nitrogenous base in DNA, Insulin is a protein , phosphodiester linkage is found in nucleic acids so also in DNA and Uracil is nitrogenous base found in RNA which is a nucleic acid.

51. (d)Helium: meteorological observations :: Argon: metallurgical processes
Nitrogen: $1s^2 2s^2 2p^3$ :: Argon: $1s^2 2s^2 2p^6$ is configuration of Neon not Argon
Carbon: maximum compounds :: Xenon: no compounds , Xenon forms compounds
XeF_2: Linear :: ClF_3: Trigonal planar , ClF_3 is T shaped not trigonal planar

52. (a) A : Isomers B: Enantiomer
Isomers have Same molecular formula but different structure
Enantiomers are Non superimposable mirror images

Q53. (c)6
The radius of Ag+ ion is 126pm and of I- ion is 216pm. The coordination number of Ag+ ion is:
$\rho = r_{cation}/r_{anion}$ = 126/ 216 = 0.58
Radius ratio lies in the range 0.414 – 0.732, so has coordination number 6 or 4 according to the table.
Since none of the options is 4, so the answer is 6

Q54. (d)290 pm
Square planar means ratio ratio is between 0.414 – 0.732
If radius of cation is 120 pm then anion should be in the range $\rho = r_{cation}/r_{anion}$
0.414 = 120/ x so x = 289.8 = 290 pm
0.732 = 120/ x so x = 163.9 = 164 pm

Q55. (a)all of its nearest neighbour anions
