LIONS SCHOOL, MIRZAPUR
PRE-BOARD EXAMINATIONS (2021-22)
Term-1

Class-XII **Time: 90 Minutes**
Sub-Chemistry (043) **M.M: 35**
General Instruction:

1. **The questions 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 25 multiple 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.

Q.1 Which of the following is not a characteristic of a crystalline solid?

a. Definite and characteristics heat of fusion
b. Isotropic nature
c. A regular periodically repeated pattern of arrangement of constituent particles in the entire crystal
d. A true solid

Q.2 Schottky defeat is observed in crystals when:

a. Some cations move from their lattice site to interstitial sites
b. Equal number of cations and anions are missing from the lattice
c. Some lattice sites are occupied by electrons
d. Some impurity is present in the lattice

Q.3 One mole of sugar is dissolved in two moles of water. The vapour pressure of the solution relative to that of pure water is:

a. 2/3
b. 1/3
c. 3/2
d. ½

Q.4 The best accurate method of determining the osmotic pressure is:

a. Haber method
b. Morse of Frazer method
c. Berkeley and Harthley method
d. Ostwald's method

Q.5 Arrange the following compounds in increasing order of boiling point.

Propan-1-ol, butan-1-ol, butan-2-ol, pentan-1-ol

a. Propane-1-ol, butan-2-ol, butan-1-ol, pentan-1-ol
b. Porpan-1-ol, butan-1-ol, butan-2-ol, pentan-1-ol
c. Pentan-1-ol, butan-2-ol, butan-1-ol, propan-1-ol
d. Pentan-1-ol, butan-1-ol, butan-2-ol, propan-1-ol

Q.6 Bases common to RNA and DNA are:

a. Adenine, guanine, cytosine
b. Adenine, uracil, cytosine
c. Adenine, guanine, thymine
d. Guanine, uracil, thymine

Q.7 Phenol on heating with $CHCl_3$ and aq. Alkali, forms:

a. 2-hydroxybenzaldehyde
b. 3-hydroxybenzaldehyde
c. 3-hydroxybenzoic acid
d. 2-hydroxybenzoic acid

Q.8 The oxyacid of sulphur that contains a lone pair of electrons on sulphur is:

a. Sulphurous acid
b. Sulphuric acid
c. Peroxydisulphuric acid
d. Pyrosulphuric acid

Q.9 Phenol can be distinguished from ethanol by the reactions with:

a. Br_2/water
b. Na
c. Neutral $FeCl_3$
d. All of these

Q.10 Which of the following defects is also known as dislocation defect?

a. Frenkel defect
b. Schottky defect
c. Non-stoichiometric defect
d. Simple interstitial defect

Q.11 The term anomers of glucose refers to:

a. Isomers of glucose that differ in configuration at carbons one and four (C-1 and C-4)
b. A mixture of D-glucose and L-glucose
c. Enantiomers of glucose
d. Isomers of glucose that differ in configuration at carbon one (C-1)

Q.12 Isotonic solutions have:

a. Same boiling point
b. Same vapour pressure
c. Same osmotic pressure
d. Same melting point

Q.13 When benzene diazonium chloride is treated with cuprous chloride in HCl, chlorobenzene is formed. This reaction is called.

a. Etard reaction
b. Perkin reaction
c. Gattermann's reaction
d. Sandmeyer's reaction

Q.14 In which of the following nitrogen exhibits highest oxidation state?

a. N_2H_4
b. NH_3
c. N_3H
d. NH_2OH

Q.15 The correct statement regarding RNA and DNA, respectively is:

a. The sugar component in RNA is arabinose and the sugar component in DNA is ribose.
b. The sugar component in RNA is 2'-deoxyribose and the sugar component in DNA is arabinose

c. The sugar component in RNA is arabinose and the sugar component in DNA is 2’-deoxyribose
d. The sugar component in RNA is ribose and the sugar component in DNA is 2’deoxyribose

Q.16 Lucas reagent is:

a. Anhydrous $ZnCl_2$ and conc. HCl
b. Anhydrous $ZnCl_2$ and conc. HNO_3
c. Hydrous $ZnCl_2$ and conc. HNO_3
d. Hydrous $ZnCl_2$ and conc. HCl

Q.17 An enzyme which changes maltose into glucose is known as:

a. Maltase
b. Zymase
c. Diastase
d. Invertase

Q.18 0.1 mole of XeF_6 is treated with 1.8 g of water. The product obtained is:

a. XeO_3
b. $XeO2F_2$
c. $XeOF_4$
d. $Xe+XeO_3$

Q.19 “Relative lowering in vapour pressure of a solution containing a non-volatile solute is directly proportional to mole fraction of solute”. Above statement is:

a. Henry’s law
b. Dulong and Petit’s law
c. Raoult’s law
d. Le chatelier’s principle

Q.20 Which among the following is the most reactive?

a. I_2
b. ICl
c. Cl_2
d. Br_2

Q.21 In nucleic acids, nucleotides are joined together by:

a. Phosphoester linkage
b. Phosphodiester linkage
c. Phosphodisulphide linkage
d. Sulphodiester linkage

Q.22 Which one of the following statements is correct?

a. All amino acids are optically active
b. All amino acids except glycine are optically active
c. All amino acids excepts glutamic acid are optically active
d. All amino acids except lysine are optically active

Q.23 The hydrolysis of 2-bromo-3- methyl butane by S_{N1} mechanism gives mainly:

a. 2,2-dimethyl-2-propanol
b. 1-pentanol
c. 2-methyl-2butanol
d. 3-methyl-2butanol

Q.24 When phenol is treated with excess of bromine water, it gives:

a. m-bromophenol
b. o-and p-bromophenol
c. 2,4-dibromophenol
d. 2,4,6-tribromophenol

Q.25 In a solid, oxide ions are arranged in ccp. Cations ‘A’ occupy one-sixth of the tetrahedral voids and cations ‘B’ occupy one-third of the octahedral voids. The formula of the compound is:

a. A_2BO_3
b. $A_2B_2O_3$
c. ABO_3
d. AB_2O_3

SECTION-B

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

Q.26 Elevation in boiling point was 0.52^0C When 6 g of a compound X was dissolved in 100 g of water. Molecular mass of the compound X is:

(K_b for water is 0.52 per 1000 g of water.)

a. 120
b. 60
c. 600
d. 180

Q.27 When ethyl chloride is heated with AgCN, the main product is:

a. Ethyl cyanide
b. Ethyl isocyanide
c. Ethyl amine
d. Ethyl nitrate

Q.28 The reaction of zinc with dilute and concentrated nitric acid respectively, produces:

a. NO_2 and NO
b. NO and N_2O
c. NO_2 and N_2O
d. N_2O and NO_2

Q.29 Glucose on prolonged heating with HI gives:

a. 1-hexene
b. Hexanoic acid
c. 6-iodohexanal
d. n-hexane

Q.30 Which of the following statements is not correct?

a. Ovalbumin is a simple food reserve in egg-white.
b. Blood proteins thrombin and fibrinogen are involved in blood clotting.
c. Denaturation makes the proteins more active.
d. Insulin maintains the sugar level in the blood of a human body.

Q.31 In a mixture, the ‘A’ and ‘B’ components show the negative deviations as:

a. $\Delta V_{mix} > 0$
b. $\Delta V_{mix} < 0$

c. A…. B interaction is weaker than A…..A and B…..B interaction
d. None of the above

Q.32 Metal M ions form accp structure. Oxide ions occupy 50% octahedral and 25% tetrahedral voids. What is the formula of the oxide?

a. MO
b. MO_2
c. MO_3
d. $M2O_3$

Q.33 The compound which does not lead to nitrile by substitution with NaCN/DMSO is:

a. Chlorobenzene
b. Benzylchloride
c. Ethylchloride
d. Iso-propylchloride

Q.34 Match the compounds given in Column-I with the shapes given in Column-II and mark the correct option:

Column-I	**Column-II**
(p) XeF_6	(i) Distorted octahedral
(q) XeO_3	(ii) Square planar
(r) $XeOF_4$	(iii) Pyramidal
(s) XeF_4	(iv) Square Pyramidal

	(p)	(q)	(r)	(s)
(a)	(i)	(iii)	(iv)	(ii)
(b)	(i)	(ii)	(iv)	(iii)
(c)	(iv)	(iii)	(i)	(ii)
(d)	(iv)	(i)	(ii)	(iii)

Q.35 In the following sequence of the reactions,

$CH_3CH_2OH \xrightarrow{P+I_2} (A) \xrightarrow[dryether]{Mg} (B) \xrightarrow{HCHO} (C) \xrightarrow{H_2O} (D)$

The Compound D is:

a. Propanal

b. Butanal
c. n-butyl alcohol
d. n-propyl alcohol

Q.36 The hybridization of atomic orbitals of nitrogen in NO_2^+, NO_3^-, NH_4^+ are:

a. Sp, sp^3 and sp^2 respectively
b. Sp^2, sp and sp^3 respectively
c. Sp, sp^2 and sp^3 respectively
d. Sp^2, sp^3 and sp respectively

Q.37 Copper crystallizes in a face cubic lattice with unit cell length of 361 pm. What is the radius of copper atom?

a. 157 pm
b. 181 pm
c. 108 pm
d. 128 pm

Q.38 Among the following oxo-acids the correct decreasing order of acid strength is:

a. $HClO_2 > HClO_4 > HClO_3 > HOCl$
b. $HOCl > HClO_2 > HClO_3 > HClO_4$
c. $HClO_4 > HOCl > HClO_2 > HClO_3$
d. $HClO_4 > HClO_3 > HClO_2 > HOCl$

Q.39 Name of the gas that can readily decolourises acidified $KMnO_4$ solution:

a. SO_2
b. NO_2
c. $P2O_5$
d. CO_2

Q.40 A solution of urea contains 8.6 g per litre. It is isotonic with a 5% solution of a non-volatile solute. The molecular mass of the solute will be:

a. 349
b. 34.9
c. 3490
d. 861

Q.41 Chlorination of toluene in presence of light and heat followed by treatment with aqueous NaOH gives:

a. O-cresol
b. P-cresol
c. 2:4 dihydroxy toluene
d. Benzyl alcohol

Q.42 The best method for the conversion of an alcohol into an alkyl chloride is by treating the alcohol with:

a. PCl_5
b. $SOCl_2$ in presence of pyridine
c. PCl_3
d. Dry HCl in presence of anhyd. $ZnCl_2$

Q.43 The correct order of reactivity of the halides,(i) ethyl chloride (ii), iso-propyl chloride (iii) and benzyl chloride in S_N^1 reaction is:

a. III>II>I
b. I>II>III
c. II>I>III
d. I>III>II

Q.44 Neopentyl bromide undergoes dehydrohalogenation to give alkenes even though it has no β-hydrogen. This is due to:

a. E_2 mechanism
b. E_1 mechanism
c. Rearrangement of carbocations by E_1 mechanism
d. E_iCB mechanism

Q.45 Q.1 <u>Read the passage given below and answers the following questions:</u>

Some liquids on mixing, from azeotropes which are binary mixtures having the same composition in liquid and vapour phase and boil at a constant temperature. In such cases, it is not possible to separate the components by fractional distillation. There are two types of azeotropes, minimum boiling azeotrope and maximum boiling azeotrope. The solutions which show a large positive deviation from Raoult's law from minimum boiling azeotrope at a specific composition while the solutions that show large negative deviation from Raoult's law from maximum boiling azeotrope at specific composition.

In these questions (Q.No (46 to 49, a statement of assertion followed by a statement of reason is given. Choose the correct answer out of the following choices.

a. Assertion and reason both are correct statements and reason is correct explanation for assertion.
b. Assertion and reason both are correct statement but reason is not correct explanation for assertion
c. Assertion is correct statement but reason is wrong statement.
d. Assertion is wrong statement but reason is correct statement.

Q.46 Assertion: A mixture of 68% nitric acid and 32% water by mass form minimum boiling azeotrope.

Reason: The solution which show a large positive deviation from Raoult's law form minimum boiling azeotrope.

Q.47 Assertion: 95% by volume ethanol-water mixture is maximum boiling azeotrope.

Reason: The solution that show large negative deviation from Raoult's law from maximum boiling azeotrope.

Q.48 Assertion: Pure ethanol cannot be obtained from rectified spirit (approx 95% by volume of ethanol) even by fractional distillation.

Reason: Rectified spirit (approx 95% by volume of ethanol) is an azeotrope, i.e., a constant boiling mixture.

Q.49 Assertion: In maximum boiling azeotropes, the boiling point of azeotrope is higher than that of either of the pure components

Reason: Boiling point of a liquid is the temperature at which its vapour pressure becomes equal to external pressure.

OR

Assertion: Non-ideal solution always form azeotropes.

Reason: Boiling point of an azeotrope may be higher or lower than boiling points of both components.

SECTION-C

This section consists of 6 multiple choice questions with an overall choice to attempt any 5 will be considered for evaluation.

Q.50 Match of the following:

(A) Pure nitrogen	(i) Chlorine
(B) Haber process	(ii) Sulphuric acid
(C) Contact process	(iii) Ammonia
(D) Deacon's process	(iv) sodium azide or barium azide

Which of the following in the correct option?

	A	B	C	D
(a)	(iv)	(iii)	(ii)	(i)
(b)	(I)	(ii)	(iii)	(iv)
(c)	(ii)	(iv)	(i)	(iii)
(d)	(iii)	(iv)	(ii)	(i)

Q.51 Which is the correct thermal stability order for H2E (E = O, S, Se, Te and Po)

a. $H_2Se<H_2Te<H_2Po<H_2O<H_2S$
b. $H_2S<H_2O<H_2Se<H_2Te<H_2Po$
c. $H_2O<H_2S<H_2Se<H_2Te<H_2Po$
d. $H_2Po<H_2Te<H_2Se<H_2S<H_2O$

Q.52 The synthesis of alkyl fluorides is best accomplished by:

a. Finkelstein reaction
b. Sandmeyer's reaction
c. Swarts reaction
d. Free radical fluorination

Read the passage and answer the following question:

The halogens on account of difference in their electronegativities combine with each other to form compounds of the type AB_n Where A

is always higher atom and B is smaller atom and ‘n’ may have values 1,3,5 and 7. These are covalent compounds and called interhalogen compounds. These compounds are either gases or liquids. These compounds are more reactive than pure halogens. The Compounds of iodine and fluorine are thermally more stable than iodine and chlorine and iodine and bromine.

Q.53 The bond in interhalogen A --- X is ..... than X ----- X bond

a. Weaker
b. Stronger
c. Can not compare
d. None

Q.54 The hybridization of iodine present in IF_3 is:

a. SP^2
b. SP3
c. SP^3d^2
d. Sp^3d

Q.55 The maximum value of ‘n’ for IF_n is

a. 6
b. 5
c. 7
d. Infinite