

Sample Paper

1

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 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.

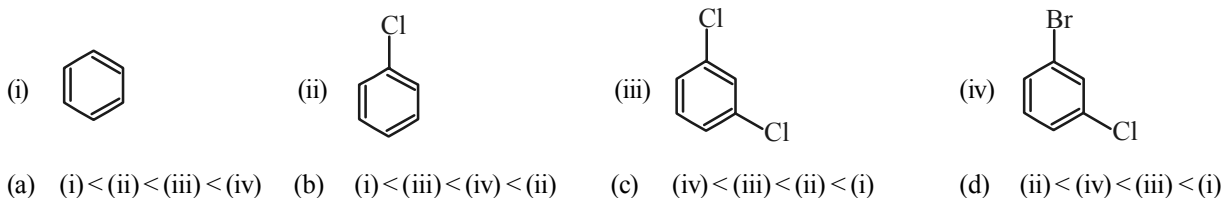
1. Which of the following exists as covalent crystals in the solid state?
(a) Iodine (b) Silicon (c) Sulphur (d) Phosphorus
2. In graphite electrons are :
(a) localised on each carbon atom (b) spread out between the sheets
(c) localised on every third carbon atom (d) present in antibonding orbital.
3. A fluorine atom (F) affects pair of an electron in a covalent bond which is
(a) Weakest (b) Strongest (c) Neutral (d) Constant
4. A crystalline solid
(a) changes abruptly from solid to liquid when heated (b) has no definite melting point
(c) undergoes deformation of its geometry easily (d) has an irregular 3-dimensional arrangements
5. An ideal solution is formed when its components
(a) have no volume change on mixing (b) have no enthalpy change on mixing
(c) have both the above characteristics (d) have high solubility.
6. Schottky defect defines imperfection in the lattice structure of
(a) solid (b) gas (c) liquid (d) plasma
7. IUPAC name of $\text{CH}_3\text{CH}_2\text{C}(\text{Br})=\text{CH}-\text{Cl}$ is
(a) 2-bromo-1-chlorobutene (b) 1-chloro-2-bromobutene
(c) 3-chloro-2-bromobutene (d) None of the above
8. Proteins are condensation polymers of
(a) α -amino acids (b) β -amino acids (c) α -hydroxy acids (d) β -hydroxy acids
9. When two halogen atoms are attached to same carbon atom then it is :
(a) vic-dihalide (b) gem-dihalide (c) α, ω -halide (d) α, β -halide
10. Which of the following noble gases react with fluorine to form compound?
(a) Krypton (b) Xenon (c) Radon (d) All of the above
11. An ether is more volatile than an alcohol having the same molecular formula. This is due to
(a) dipolar character of ethers (b) alcohols having resonance structures
(c) inter-molecular hydrogen bonding in ethers (d) inter-molecular hydrogen bonding in alcohols
12. The space lattice of graphite is
(a) cubic (b) tetragonal (c) rhombic (d) hexagonal

13. The process of converting alkyl halides into alcohols involves
- (a) addition reaction (b) substitution reaction (c) dehydrohalogenation (d) rearrangement reaction
14. Which of the following factor do not affect solubility of solid solute in liquid?
- (a) Temperature (b) Pressure (c) Nature of solute (d) All of these
15. Which of the following has strongest hydrogen bonding?
- (a) Ethyl amine (b) Ethanal (c) Ethyl alcohol (d) Diethyl ether
16. What is hybridization of P in PCl_5 ?
- (a) sp^3 (b) sp^3d^2 (c) sp^3d (d) sp^2
17. Which of the following is correct about H-bonding in nucleotide?
- (a) A --- A and T --- T (b) G --- T and A --- C (c) A --- G and T --- C (d) A --- T and G --- C
18. Ethylene dichloride can be prepared by adding HCl to
- (a) ethane (b) ethylene (c) acetylene (d) ethylene glycol
19. Haloarenes are ortho and para directing due to
- (a) Resonance in aryl halide (b) -I effect of halogen atom
(c) +I effect of halogen atom (d) Both (a) and (b)
20. On heating lead nitrate forms oxides of nitrogen and lead. The oxides formed are
- (a) N_2O , PbO (b) NO_2 , PbO (c) NO , PbO (d) NO , PbO_2
21. Which one of the following is non-ideal solution
- (a) Benzene + toluene (b) *n*-hexane + *n*-heptane
(c) Ethyl bromide + ethyl iodide (d) $\text{CCl}_4 + \text{CHCl}_3$
22. Collectively the elements of group 15 are called –
- (a) pnictogens (b) pnicipens (c) nicopen (d) None of these
23. Insulin production and its action in human body are responsible for the level of diabetes. This compound belongs to which of the following categories?
- (a) A carbohydrate (b) A hormone (c) A co-enzyme (d) An antibiotic
24. Which one of the following elements is most metallic ?
- (a) P (b) As (c) Sb (d) Bi
25. Which of the following elements does not show allotropy?
- (a) Nitrogen (b) Bismuth (c) Antimony (d) Arsenic

SECTION-B

*This section consists of 24 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.*

26. Which of the following liquid pairs shows a positive deviation from Raoult's law ?
- (a) Water - Nitric acid (b) Benzene - Methanol
(c) Water - Hydrochloric acid (d) Acetone - Chloroform
27. The vapour pressure of two liquids 'P' and 'Q' are 80 and 60 torr, respectively. The total vapour pressure of solution obtained by mixing 3 mole of P and 2 mole of Q would be
- (a) 72 torr (b) 140 torr (c) 68 torr (d) 20 torr
28. Arrange the following compounds in the increasing order of their densities.



29. Which of the following is not tetrahedral in shape?
 (a) NH_4^+ (b) SiCl_4 (c) SF_4 (d) SO_4^{2-}
30. Primary structure of a protein is
 (a) sequence in which α -amino acids are linked to one another
 (b) sequence in which amino acids of one polypeptide chain are joined to other chain
 (c) the folding patterns of polypeptide chains
 (d) the pattern in which the polypeptide chains are arranged
31. $\text{>Br} + \text{NaOH} \xrightarrow{\text{Solvent}} \text{>OH}$
 For which solvent rate of $\text{S}_{\text{N}}2$ will be maximum?
 (a) Benzene (b) 100% H_2O
 (c) 100% acetone (d) 75% $\text{H}_2\text{O} + 25\%$ acetone
32. S – S bond is not present in
 (a) $\text{S}_2\text{O}_4^{2-}$ (b) $\text{S}_2\text{O}_5^{2-}$ (c) $\text{S}_2\text{O}_3^{2-}$ (d) $\text{S}_2\text{O}_7^{2-}$
33. Which of the following is not a crystalline solid?
 (a) KCl (b) CsCl (c) Glass (d) Rhombic S
34. For the compounds CH_3Cl , CH_3Br , CH_3I and CH_3F ,
 the correct order of increasing C-halogen bond length is:
 (a) $\text{CH}_3\text{F} < \text{CH}_3\text{Cl} < \text{CH}_3\text{Br} < \text{CH}_3\text{I}$ (b) $\text{CH}_3\text{F} < \text{CH}_3\text{Br} < \text{CH}_3\text{Cl} < \text{CH}_3\text{I}$
 (c) $\text{CH}_3\text{F} < \text{CH}_3\text{I} < \text{CH}_3\text{Br} < \text{CH}_3\text{Cl}$ (d) $\text{CH}_3\text{Cl} < \text{CH}_3\text{Br} < \text{CH}_3\text{F} < \text{CH}_3\text{I}$
35. XeF_6 dissolves in anhydrous HF to give a good conducting solution which contains:
 (a) H^+ and XeF_7^- ion (b) HF_2^- and XeF_5^+ ions (c) HXeF_6^+ and F^- ions (d) None of these
36. Equal moles of water and urea are taken in a flask. What is mass percentage of urea in the solution ?
 (a) 7.692% (b) 769.2% (c) 76.92% (d) 0.7692%
37. Which statement is not correct about alcohol?
 (a) Molecular weight of alcohol is higher than water
 (b) Alcohol of less no. of carbon atoms is less soluble in water than alcohol of more no. of carbon atoms
 (c) Alcohol evaporates quickly
 (d) All of the above
38. Strong reducing behaviour of H_3PO_2 is due to
 (a) low oxidation state of phosphorus
 (b) presence of two — OH groups and one P — H bond
 (c) presence of one — OH group and two P — H bonds
 (d) high electron gain enthalpy of phosphorus
39. What is the coordination number of sodium and oxygen in Na_2O in which oxide ions occupy ccp arrangement and sodium ions occupy all tetrahedral voids?
 (a) 6,4 (b) 4,8 (c) 8,4 (d) 2,4
40. Which of the following group 15 element forms metallic bonds in elemental state ?
 (a) As (b) P (c) Sb (d) Bi
41. Isopropyl alcohol is obtained by reacting which of the following alkenes with concentrated H_2SO_4 followed by boiling with H_2O ?
 (a) Ethylene (b) Propylene (c) 2-Methylpropene (d) Isoprene
42. Which of the following cannot be made by using Williamson's synthesis?
 (a) Methoxybenzene (b) Benzyl *p*-nitrophenyl ether
 (c) Methyl tertiary butyl ether (d) Di-tert-butyl ether
43. PCl_3 reacts with water to form
 (a) PH_3 (b) H_3PO_4 and HCl (c) POCl_3 (d) H_3PO_4
44. Which of the following compounds is resistant to nucleophilic attack by hydroxyl ions?
 (a) Methyl acetate (b) Acetonitrile (c) Acetamide (d) Diethyl ether

Given below are two statements labelled as Assertion (A) and Reason (R). 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 and R is also false.

45. **Assertion :** $\text{PhC}(\text{O})\text{CH}_2\text{Cl}$ is more reactive than PhCH_2Cl .



Reason : Conjugation with carbonyl group much more effective than with simple alkene or benzene ring.

46. **Assertion :** Bond angle of H_2S is smaller than H_2O .

Reason : Electronegativity of the central atom increases, bond angle decreases.

47. **Assertion :** Alkyl fluorides are prepared by heating AgF with alkyl chloride.

Reason : Because direct fluorination of alkanes occurs very slowly with rupture of $\text{C} = \text{C}$ bonds.

48. **Assertion :** Molarity of a solution in liquid state changes with temperature.

Reason : The volume of a solution changes with change in temperature.

49. **Assertion :** Dinitrogen is inert at room temperature.

Reason : Dinitrogen directly combines with lithium to form ionic nitrides.

SECTION-C

This section consists of 6 multiple 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 columns

Column-I

- (A) Mass percentage
 (B) Mass by volume
 (C) ppm
 (D) Volume percentage

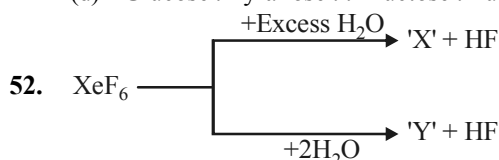
- (a) A – (q), B – (p), C – (s), D – (r)
 (c) A – (r), B – (q), C – (s), D – (p)

Column-II

- (p) Medicine and pharmacy
 (q) Concentration of pollutants in water
 (r) Industrial chemical application
 (s) Liquid solutions
 (b) A – (s), B – (r), C – (p), D – (q)
 (d) A – (r), B – (p), C – (q), D – (s)

51. Which of the following analogy is incorrect?

- (a) Optically inactive amino acid : Glycine :: Optically active protein : Lysine
 (b) Essential amino acid : Lysine :: Non essential amino acid : Glycine
 (c) Basic amino acid : Aspartate :: Acidic amino acid : Histidine
 (d) Glucose : Pyranose :: Fructose : Furanose



Correct analogy for X : Y

- (a) X : XeO_3 :: Y : XeOF_4
 (b) X : Xe :: Y : XeO_3
 (c) X : XeO_2F_2 :: Y : Xe
 (d) X : XeO_3 :: Y : XeO_2F_2

Case Study : Read the following paragraph and answers the questions.

Alkyl halides are insoluble in water but soluble in organic solvents. The insolubility in water is due to their inability to form hydrogen bonds with water. Alkyl bromides and iodides are denser than water whereas alkyl chlorides and fluorides are lighter than water. Alkyl halides have higher boiling points than alkanes of comparable molecular weight. For a given halogen atom, the boiling points of alkyl halides increase with the increase in the size of the alkyl group.

53. Which of the following is liquid at room temperature (b.p. is shown against it)?

- (a) CH_3I (42 °C) (b) CH_3Br (3 °C) (c) $\text{C}_2\text{H}_5\text{Cl}$ (12 °C) (d) CH_3F (–78 °C)

54. Which of the following possesses highest melting point?

- (a) Chlorobenzene (b) *m*-dichlorobenzene (c) *o*-dichlorobenzene (d) *p*-dichlorobenzene

55. The decreasing order of boiling points of alkyl halides is

- (a) $\text{RF} > \text{RCl} > \text{RBr} > \text{RI}$ (b) $\text{RBr} > \text{RCl} > \text{RI} > \text{RF}$ (c) $\text{RI} > \text{RBr} > \text{RCl} > \text{RF}$ (d) $\text{RCl} > \text{RF} > \text{RI} > \text{RBr}$

OMR ANSWER SHEET

Sample Paper No –1

- ★ Use Blue / Black Ball pen only.
- ★ Please do not make any stray marks on the answer sheet.
- ★ Rough work must not be done on the answer sheet.
- ★ Darken one circle deeply for each question in the OMR Answer sheet, as faintly darkened / half darkened circle might be rejected.

Start time : _____ End time _____ Time taken _____

1. Name (in Block Letters)

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2. Date of Exam

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3. Candidate's Signature

SECTION-A

<p>1. (a) (b) (c) (d)</p> <p>2. (a) (b) (c) (d)</p> <p>3. (a) (b) (c) (d)</p> <p>4. (a) (b) (c) (d)</p> <p>5. (a) (b) (c) (d)</p> <p>6. (a) (b) (c) (d)</p> <p>7. (a) (b) (c) (d)</p> <p>8. (a) (b) (c) (d)</p> <p>9. (a) (b) (c) (d)</p>	<p>9. (a) (b) (c) (d)</p> <p>10. (a) (b) (c) (d)</p> <p>11. (a) (b) (c) (d)</p> <p>12. (a) (b) (c) (d)</p> <p>13. (a) (b) (c) (d)</p> <p>14. (a) (b) (c) (d)</p> <p>15. (a) (b) (c) (d)</p> <p>16. (a) (b) (c) (d)</p> <p>17. (a) (b) (c) (d)</p>	<p>18. (a) (b) (c) (d)</p> <p>19. (a) (b) (c) (d)</p> <p>20. (a) (b) (c) (d)</p> <p>21. (a) (b) (c) (d)</p> <p>22. (a) (b) (c) (d)</p> <p>23. (a) (b) (c) (d)</p> <p>24. (a) (b) (c) (d)</p> <p>25. (a) (b) (c) (d)</p>
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SECTION-B

<p>26. (a) (b) (c) (d)</p> <p>27. (a) (b) (c) (d)</p> <p>28. (a) (b) (c) (d)</p> <p>29. (a) (b) (c) (d)</p> <p>30. (a) (b) (c) (d)</p> <p>31. (a) (b) (c) (d)</p> <p>32. (a) (b) (c) (d)</p> <p>33. (a) (b) (c) (d)</p>	<p>34. (a) (b) (c) (d)</p> <p>35. (a) (b) (c) (d)</p> <p>36. (a) (b) (c) (d)</p> <p>37. (a) (b) (c) (d)</p> <p>38. (a) (b) (c) (d)</p> <p>39. (a) (b) (c) (d)</p> <p>40. (a) (b) (c) (d)</p> <p>41. (a) (b) (c) (d)</p>	<p>42. (a) (b) (c) (d)</p> <p>43. (a) (b) (c) (d)</p> <p>44. (a) (b) (c) (d)</p> <p>45. (a) (b) (c) (d)</p> <p>46. (a) (b) (c) (d)</p> <p>47. (a) (b) (c) (d)</p> <p>48. (a) (b) (c) (d)</p> <p>49. (a) (b) (c) (d)</p>
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SECTION-C

<p>50. (a) (b) (c) (d)</p> <p>51. (a) (b) (c) (d)</p>	<p>52. (a) (b) (c) (d)</p> <p>53. (a) (b) (c) (d)</p>	<p>54. (a) (b) (c) (d)</p> <p>55. (a) (b) (c) (d)</p>
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No. of Qns. Attempted		Correct		Incorrect		Marks	
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