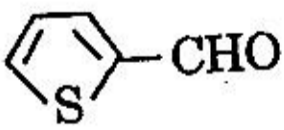
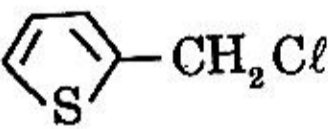
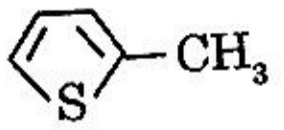
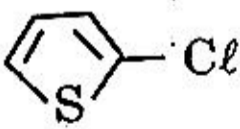
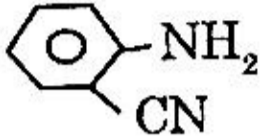

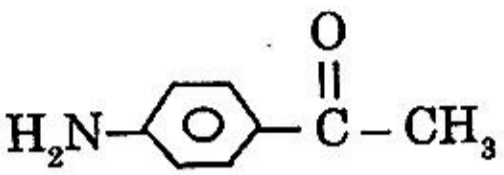
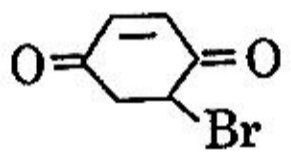
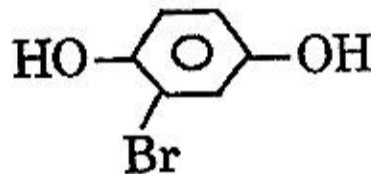
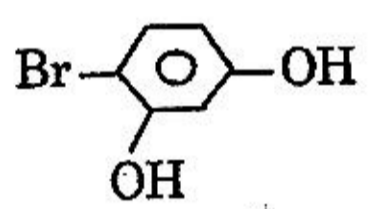
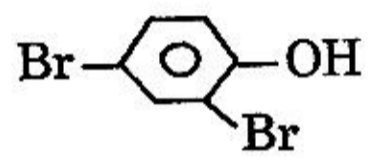


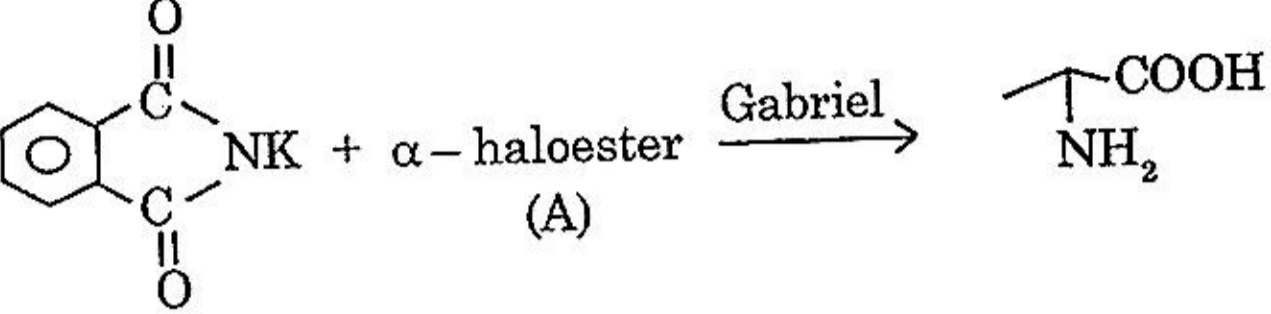
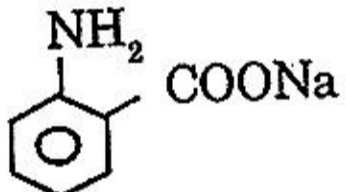
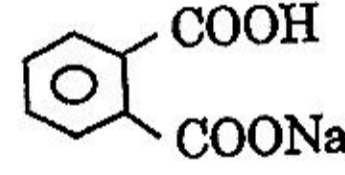
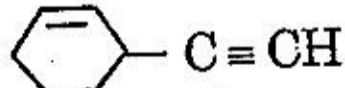
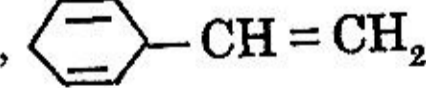
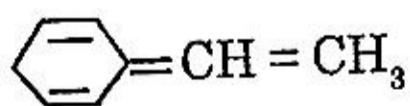
| Question No. | Questions |
|--------------|--|
| 1. | <p style="text-align: center;"> </p> <p>X and Y are</p> <ol style="list-style-type: none"> (1) Picric acid, 2, 4, 6 – tribromophenol (2) 4-nitro salicylic acid, 4-bromo salicylic acid (3) o-nitrophenol, o-bromophenol (4) None is correct |
| 2. | <p style="text-align: center;"> </p> <p>A is</p> <ol style="list-style-type: none"> (1) (2) (3) (4) |
| 3. | <p style="text-align: center;"> </p> <p>A and B are</p> <ol style="list-style-type: none"> (1) , (2) , (3) , (4) None is correct |

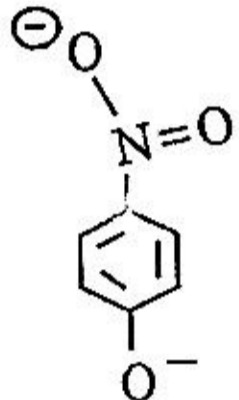
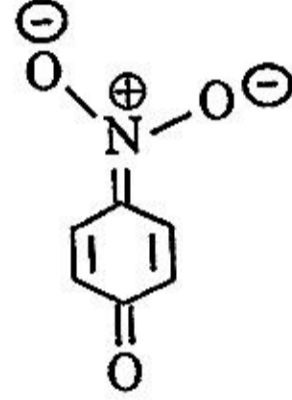
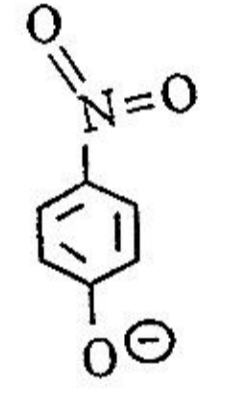
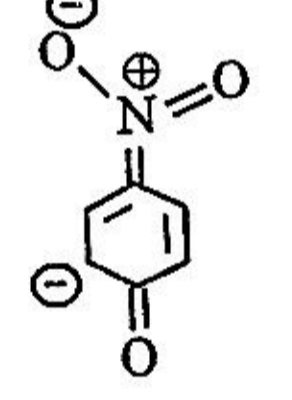
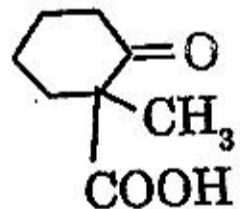
| Question No. | Questions |
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| 4. | $\text{C}_6\text{H}_6 + \text{HCl} + \frac{1}{2} \text{O}_2 \longrightarrow \text{C}_6\text{H}_5\text{Cl}$ <p>This is called reaction</p> <p>(1) Sandmeyer (2) Raschig (3) Gatterman (4) Hofmann</p> |
| 5. | $\text{C}_6\text{H}_5\text{N}(\text{CH}_3)_2 \xrightarrow[\text{(ii) H}_3\text{O}^{\oplus}]{\text{(i) HNO}_2} \text{A} + \text{B}$ <p>(1) HO-C₆H₄-NO, (CH₃)₂NH (2) HO-C₆H₄-OH, (CH₃)₂NH (3) HO-C₆H₄-NO, CH₃CH₂NH₂ (4) None is correct</p> |
| 6. | <p>In the reaction sequence</p> $\text{C}_6\text{H}_6 \xrightarrow[\text{AlCl}_3 \text{ (anhy)}]{\text{CH}_3\text{Cl}} \text{(X)} \xrightarrow{\text{KMnO}_4} \text{(Y)}$ <p>The product (Y) is</p> <p>(1) Chlorobenzene (2) Benzaldehyde (3) Benzoic acid (4) Benzene</p> |
| 7. | <p>Thiophene reacts with HCHO in presence of aqueous HCl to give</p> <p>(1)  (2)  (3)  (4) </p> |

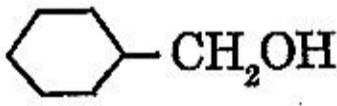
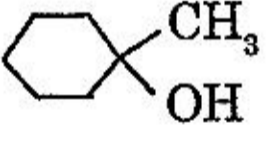
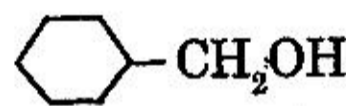
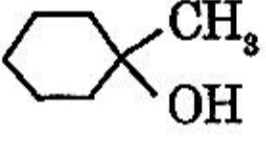
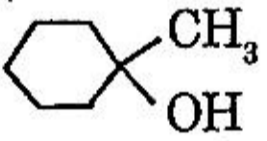
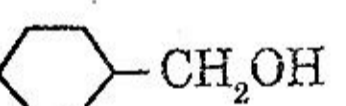
| Question No. | Questions |
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| 8. | Which is weaker base than aniline (1)  (2)  (3)  (4) All |
| 9. | End product of following reaction is $\text{O}=\text{C}_6\text{H}_4=\text{O} + \text{HBr}$ (1)  (2)  (3)  (4)  |
| 10. | The reagent with which both aldehydes and ketones react easily is (1) Fehling's reagent (2) Schiff's reagent (3) Tollen's reagent (4) Grignard reagent |
| 11. | Which of the following compounds will exhibit geometrical isomerism (1) 1, 1-diphenyl-1-propene (2) 3-phenyl-1-butene (3) 2-phenyl-1-butene (4) 1-phenyl-2-butene |
| 12. | Propyne and propene can be distinguished by (1) Conc. H_2SO_4 (2) Br_2 in CCl_4 (3) Dil. KMnO_4 (4) AgNO_3 in ammonia |

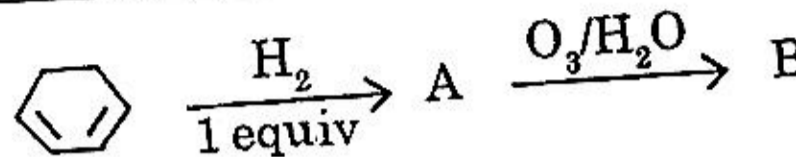

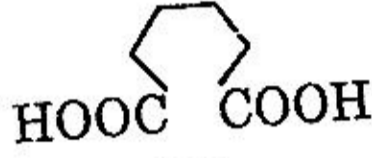


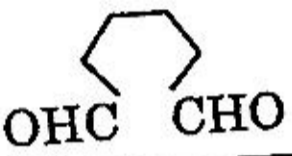
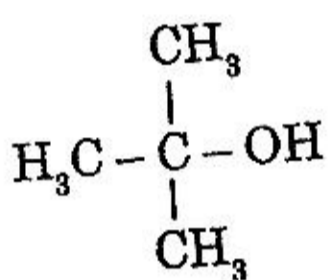
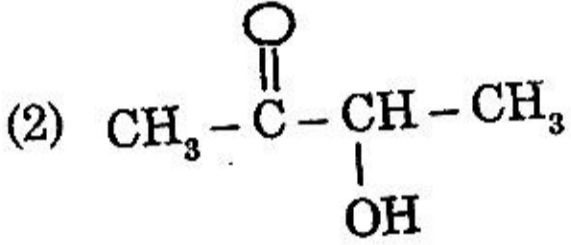
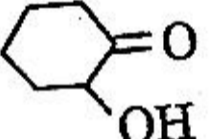
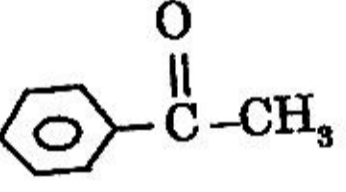
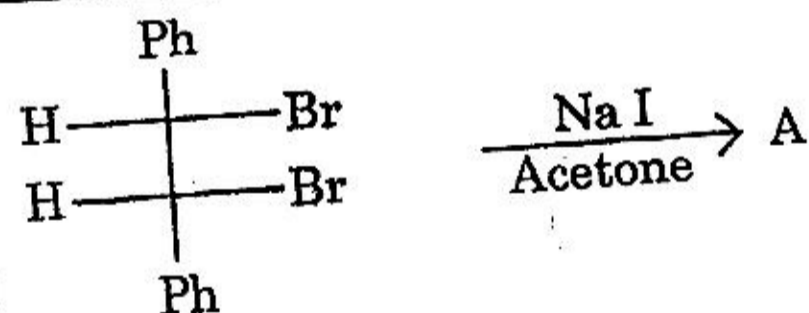
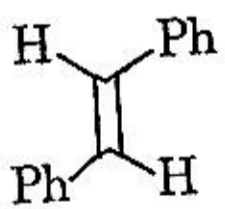
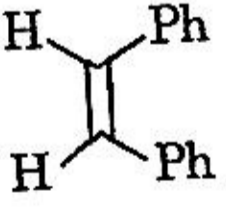
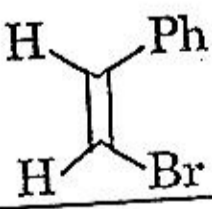
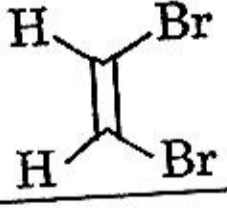
| Question No. | Questions |
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| 13. | Which of the following has the most acidic hydrogen (1) 3-Hexanone (2) 2, 4-hexanedione (3) 2, 5-hexanedione (4) 2, 3-hexanedione |
| 14. | Ammonia can be dried by (1) Conc. H_2SO_4 (2) P_4O_{10} (3) CaO (4) Anhydrous $CaCl_2$ |
| 15. | Amongst H_2O , H_2S , H_2Se and H_2Te , the one with the highest boiling point is (1) H_2O because of hydrogen bonding (2) H_2S because of hydrogen bonding (3) H_2Te because of higher molecular weight (4) H_2Se because of lower molecular weight |
| 16. | When a mixture of one mole of C_6H_5COOH and one mole of C_6H_5OH is treated with one mole of $NaHCO_3$, the product formed will consist of (1) C_6H_5COOH , C_6H_5ONa (2) C_6H_5COONa , C_6H_5ONa (3) C_6H_5COONa , C_6H_5OH (4) None |
| 17. | Addition of ethanol to aqueous hydrolysis of $\text{C}_6\text{H}_5\text{CH}_2\text{Cl}$ does not increase the rate of hydrolysis but changes only the composition of final products. This indicates that reaction is proceeding through (1) SN^2 (2) SN^1 (3) SE^2 (4) SE^1 |
| 18. | Which one of the following is the best method for the preparation of acetophenone (1) $PhCOOEt + CH_3MgBr$ (2) $PhCOCl + CH_3MgBr$ (3) $PhCONH_2 + CH_3MgBr$ (4) $PhCN + CH_3MgBr$ |

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| Question No. | Questions |
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| 19. |  <p>Required product is obtained when A is</p> <p>(1) Ethyl-3-Chlorobutyrate (2) Ethyl-3-Chloropropionate (3) Ethyl-2-Chloropropionate (4) Ethyl Chloroacetate</p> |
| 20. | $C_6H_{10} \xrightarrow{\text{Ozonolysis}} HCHO + CH_3CHO + CH_2(CHO)_2$ <p>C_6H_{10} is</p> <p>(1) 1, 2-hexadiene (2) 1, 3-hexadiene (3) 1, 4-hexadiene (4) 2-methyl-1, 3-pentadiene</p> |
| 21. | <p>Reagent which can convert an alkyl amine into alkyl chloride</p> <p>(1) Hinsberg's reagent (2) Lucas reagent (3) Tilden reagent (4) None</p> |
| 22. | <p>Which is/are acid salt</p> <p>(1)  (2) </p> <p>(3) NaH_2PO_2 (4) Na_2HPO_3</p> |
| 23. | <p>Index of unsaturation of C_8H_{10} in six membered structure is</p> <p>(1) 4,  (2) 4, </p> <p>(3) 4,  (4) All true</p> |

| Question No. | Questions |
|--------------|--|
| 24. | <p>The mononitration of acetanilide ($C_6H_5NHCOCH_3$) gives predominantly</p> <p>(1) 3-nitroacetanilide (2) 2-nitroacetanilide</p> <p>(3) 2-, and 3-nitroacetanilide (4) 4-nitroacetanilide</p> |
| 25. | <p>The most unlikely representation of resonance structures of p-nitrophenoxide ion is</p> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>(1) </p> </div> <div style="text-align: center;"> <p>(2) </p> </div> </div> <div style="display: flex; justify-content: space-around; margin-top: 20px;"> <div style="text-align: center;"> <p>(3) </p> </div> <div style="text-align: center;"> <p>(4) </p> </div> </div> |
| 26. | <p>Chirality is lost when</p> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>(1) $CH_3-CH(OH)-COOH$ is heated</p> </div> <div style="text-align: center;"> <p>(2)  is heated</p> </div> </div> <div style="display: flex; justify-content: space-around; margin-top: 20px;"> <div style="text-align: center;"> <p>(3) $CH_3-CH(OH)-CH_2COOH$ is heated</p> </div> <div style="text-align: center;"> <p>(4) $CH_3-CH(CH_2COOH)-COOH$ is heated</p> </div> </div> |

| Question No. | Questions |
|--------------|---|
| 27. | $ \begin{array}{c} \text{CH}_3 \\ \\ \text{H}-\text{C} \\ \\ \text{C}-\text{H} \\ \\ \text{CH}_3 \end{array} \xrightarrow{\text{Br}_2} \begin{array}{c} \text{CH}_3 \\ \\ \text{H}-\text{C}-\text{Br} \\ \\ \text{H}-\text{C}-\text{Br} \\ \\ \text{CH}_3 \end{array} $ <p style="text-align: center;">Trans A</p> <p>which is true statement</p> <p>(1) A is formed by anti addition and is meso (2) A is formed by syn addition and is meso (3) A is formed by anti addition and is racemic (4) A is formed by syn addition and is racemic</p> |
| 28. | $ \text{B} \xleftarrow[\text{H}_2\text{O}_2/\text{OH}^-]{\text{BH}_3/\text{THF}} \text{Cyclohexane ring}=\text{CH}_2 \xrightarrow{\text{H}_3\text{O}^+} \text{A} $ <p>A and B are</p> <p>(1) Both  (2) Both </p> <p>(3) ,  (4) , </p> |
| 29. | $ \text{CH} \equiv \text{C}-\text{COOH} \xrightarrow{\text{Hg SO}_4/\text{H}_2\text{SO}_4} \text{Product} $ <p>(1) $\text{CH}_3-\overset{\text{O}}{\parallel}{\text{C}}-\text{COOH}$ (2) $\text{OHCCH}_2\text{COOH}$ (3) $\text{CH}_2=\overset{\text{OH}}{\mid}{\text{C}}-\text{COOH}$ (4) $\text{HO}-\text{CH}=\text{CH}-\text{COOH}$</p> |

| Question No. | Questions |
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| 30. | <p>  </p> <p>A and B are</p> <p>(1) ,  (2) , not formed</p> <p>(3) ,  (4) None is correct</p> |
| 31. | <p>Maximum dehydration takes place of</p> <p>(1)  (2) </p> <p>(3)  (4) </p> |
| 32. | <p>  </p> <p>A is</p> <p>(1)  (2) </p> <p>(3)  (4) </p> |

| Question No. | Questions |
|--------------|--|
| 33. | <p style="text-align: center;"> $B \xleftarrow[\text{CH}_3\text{ONa}]{\text{CH}_3\text{OH}} \text{CH}_3-\overset{\text{CH}_3}{\underset{\text{O}}{\text{C}}}-\text{CH}_2 \xrightarrow[\text{H}^\oplus]{\text{H}_2\text{O}^{18}} A$ </p> <p>A and B are</p> <p>(1) $\text{CH}_3-\overset{\text{CH}_3}{\underset{^{18}\text{OH}}{\text{C}}}-\underset{\text{OH}}{\text{CH}_2}$ $\text{CH}_3-\overset{\text{CH}_3}{\underset{\text{OH}}{\text{C}}}-\underset{\text{OCH}_3}{\text{CH}_2}$</p> <p>(2) $\text{CH}_3-\overset{\text{CH}_3}{\underset{\text{OH}}{\text{C}}}-\underset{^{18}\text{OH}}{\text{CH}_2}$ $\text{CH}_3-\overset{\text{CH}_3}{\underset{\text{OH}}{\text{C}}}-\underset{\text{OCH}_3}{\text{CH}_2}$</p> <p>(3) Both are correct</p> <p>(4) None is correct</p> |
| 34. | <p style="text-align: center;"> $\text{Glycerol} + \text{KHSO}_4 \longrightarrow A \xrightarrow{\text{HClO}} B$ </p> <p>A and B are</p> <p>(1) $\text{CH}_2 = \text{CH} - \text{CHO}$, $\underset{\text{Cl}}{\text{CH}_2} - \underset{\text{OH}}{\text{CH}} - \text{CHO}$</p> <p>(2) $\text{CH}_2 = \text{CH} - \text{CHO}$, $\underset{\text{OH}}{\text{CH}_2} - \underset{\text{Cl}}{\text{CH}} - \text{CHO}$</p> <p>(3) $\text{CH}_2 = \text{CH} - \text{CHO}$, $\text{CH}_3 - \underset{\text{OCl}}{\text{CH}} - \text{CHO}$</p> <p>(4) None is correct</p> |

| Question No. | Questions |
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| 35. | The quantum numbers, for the outer electrons of an atom are given by $n = 2 ; \ell = 0 ; m = 0 ; s = + 1/2$ (1) Lithium (2) Beryllium (3) Hydrogen (4) Boron |
| 36. | "The exact path of electron 2p-orbital cannot be determined" The above statement is based upon (1) Hund's rule (2) Bohr's rule (3) Uncertainty principle (4) Aufbau principle |
| 37. | The ground state configuration of Fe^{3+} ion in gaseous state is (At. No. of Fe = 26) (1) $[\text{Ar}]^{18} 3d^3 4s^2$ (2) $[\text{Ar}]^{18} 3d^6 4s^2$ (3) $[\text{Ar}]^{18} 3d^5$ (4) $[\text{Ar}]^{18} 3d^6$ |
| 38. | Which of the following is the smallest in size (1) N^{3-} (2) O^{2-} (3) F^- (4) Na^+ |
| 39. | The electronegativity of the following elements increases in the order (1) C, N, Si, P (2) N, Si, C, P (3) Si, P, C, N (4) P, Si, N, C |
| 40. | In ClF_3 , Chlorine is (1) sp^2 hybridized (2) sp^3 hybridized (3) sp^3d hybridized (4) sp^3d^2 hybridized |
| 41. | The angles between covalent bonds is maximum in (1) CH_4 (2) BF_3 (3) PF_3 (4) NH_3 |

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| Question No. | Questions |
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| 42. | Ionic solids with Schottky defects contain in their structure (1) equal number of cation and anion vacancies (2) interstitial anions and anion vacancies (3) cation vacancies only (4) cation vacancies and interstitial cations |
| 43. | The H-Bonds in solid HF can be best represented as (1) $\text{H} - \text{F} \cdots \cdots \text{H} - \text{F} \cdots \cdots \text{H} - \text{F}$ (2) $\begin{array}{ccccccc} & \text{H} & & \text{H} & & \text{H} & \\ & \diagdown & & \diagup & & \diagdown & \\ & \text{F} & \cdots & \text{H} & \cdots & \text{F} & \\ & \diagup & & \diagdown & & \diagup & \\ & \text{H} & & \text{H} & & \text{H} & \end{array}$ (3) $\begin{array}{ccccccc} & \text{F} & & \text{H} & & \text{F} & \\ & \diagdown & & \diagup & & \diagdown & \\ & \text{H} & \cdots & \text{H} & \cdots & \text{H} & \\ & \diagup & & \diagdown & & \diagup & \\ & \text{F} & & \text{F} & & \text{F} & \end{array}$ (4) $\begin{array}{ccccccc} & \text{H} & & \text{H} & & \text{H} & \\ & \diagdown & & \diagup & & \diagdown & \\ & \text{F} & \cdots & \text{F} & \cdots & \text{F} & \\ & \diagup & & \diagdown & & \diagup & \\ & \text{H} & & \text{H} & & \text{H} & \end{array}$ |
| 44. | In which of the following molecules the van der Waal's forces is likely to be the most important in determining the m.pt. and b.pt. (1) CO (2) H ₂ S (3) Br ₂ (4) HCl |
| 45. | Alkali metal hydrides react with water to give (1) Acidic solution (2) Basic solution (3) Neutral solution (4) Hydride ion |
| 46. | Which is a planar molecule (1) XeO ₄ (2) XeF ₄ (3) XeOF ₄ (4) XeO ₂ F ₂ |

| Question No. | Questions |
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| 47. | A silicate used in talcum powder (1) consists of planar sheets which can slip over another (2) is known as talc (3) is a pure magnesium silicate of the form $3 \text{MgO} \cdot 4 \text{SiO}_2 \cdot \text{H}_2\text{O}$ (4) All of these |
| 48. | Which of the following has the stronger bond (1) F – B (2) F – Cl (3) F – Br (4) Cl – Br |
| 49. | Which one of the following metal ions is coloured (1) Cu^+ (2) Zn^{2+} (3) Sc^{3+} (4) V^{4+} |
| 50. | Among the lanthanides the one obtained by synthetic method is (1) Lu (2) Pm (3) Pr (4) Gd |
| 51. | Thorium element belongs to (1) Alkali metal (2) Transition elements (3) Lanthanides (4) Actinides |
| 52. | H_2S would separate the following at $\text{pH} < 7$ (1) Zn^{2+} , Co^{2+} (2) Cu^{2+} , Cd^{2+} (3) Cu^{2+} , Cr^{3+} (4) Cu^{2+} , As^{3+} |
| 53. | Nitrite (NO_2^-) interferes in the 'ring-test' of nitrate (NO_3^-). Some of the following reagents can be used for the removal of nitrite (I) NH_4Cl (II) $(\text{NH}_2)_2\text{CS}$ thiourea (III) $\text{NH}_2\text{SO}_3\text{H}$ (sulphamic acid) (IV) Sulphanilic acid Correct choice is (1) I, II (2) I, II, IV (3) I, II, III (4) II, III, IV |

| Question No. | Questions |
|--------------|--|
| 54. | The oxidation number of Fe in $K_4 [Fe (CN)_6]$ is (1) 3 (2) 2 (3) 0 (4) 1 |
| 55. | CFSE value for an octahedral low spin d^6 metal ion complex will be (1) 20 Dq (2) 24 Dq (3) 12 Dq (4) 6 Dq |
| 56. | The number of unpaired electrons in a d^7 tetrahedral complex (1) 3 (2) 2 (3) 1 (4) 7 |
| 57. | E.A.N in $[Ni (NH_3)_6]^{2+}$ is (1) 38 (2) 36 (3) 40 (4) 37 |
| 58. | Term symbol for ground state V^{3+} is (1) 3F_2 (2) $^4S_{3/2}$ (3) 3P_0 (4) 3P_2 |
| 59. | How many geometrical isomers are possible for $[Co (NH_3)_4 Cl_2]$ (1) two (2) three (3) four (4) six |
| 60. | Which of the following metal-carbonyls is paramagnetic (1) $Fe (CO)_5$ (2) $Ni (CO)_4$ (3) $V (CO)_6$ (4) $Cr (CO)_6$ |
| 61. | Which of the following carbonyls does not possess bridged CO (1) $Fe_2 (CO)_9$ (2) $Fe_3 (CO)_{12}$ (3) $Ru_3 (CO)_{12}$ (4) $Co_2 (CO)_8$ |

| Question No. | Questions |
|--------------|--|
| 68. | Radioactivity of a sample ($Z = 22$) decreases 90% after 10 years. What will be the half life of the sample (1) 5 years (2) 2 years (3) 3 years (4) 10 years |
| 69. | A catalyst is a substance which (1) Supplies energy to the reaction (2) Shortens the time to reach the equilibrium (3) Increases the equilibrium constant of the reaction (4) Increases the equilibrium concentration of the product |
| 70. | The temperature of the system decreases in an (1) Adiabatic compression (2) Isothermal expansion (3) Isothermal compression (4) Adiabatic expansion |
| 71. | Consider a pure crystalline solid that is heated from absolute zero to a temperature above the boiling point of the liquid. Which of the following processes produces the greatest increase in entropy of the substance (1) Vaporizing the liquid (2) Melting the solid (3) Heating the liquid (4) Heating the gas |
| 72. | Elastic deformation in polymers is due to (1) Slight adjustment of molecular chains (2) Slippage of molecular chains (3) Straightening of molecular chains (4) Severe of covalent bonds |

| Question No. | Questions |
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| 73. | Which of the following process is responsible for the formation of delta at a place where rivers meet the sea (1) Emulsification (2) Coagulation (3) Colloid formation (4) Peptization |
| 74. | Which of the following is correct for lyophilic sols (1) They are Irreversible (2) They are formed by inorganic substances (3) They are self stabilized (4) They are readily coagulated by addition of electrolytes |
| 75. | Buffer solutions have constant acidity and alkalinity because (1) They have large excess of H^+ or OH^- ions (2) They have fixed value of pH (3) Acids and Alkalies in these solutions are shielded from attack by other ions (4) These give unionized acid or base on reaction with added acid or alkali |
| 76. | Automobile steering wheels are normally made of (1) High density polythene (2) Cellulose acetate (3) Cellulose nitrate (4) PVC |
| 77. | The de Broglie wavelength of an electron with kinetic energy of 1.0 eV is (1) 28.7 pm (2) 2.87 pm (3) 12.3 nm (4) 1.23 nm |

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| Question No. | Questions |
|--------------|--|
| 92. | <p>A hydrogen electrode and a normal calomel electrode had a voltage 0.435 V when placed in a certain solution at 298 K. What will be the pH of the solution</p> <p>(1) 2.125 (2) 2.205 (3) 2.622 (4) 2.014</p> |
| 93. | <p>A photon in 'X' region is more energetic than in the visible region. The 'X' is</p> <p>(1) Micro wave (2) Radio wave (3) IR (4) UV</p> |
| 94. | <p>Select the correct statement</p> <p>(1) Composite reactions differ from complex reactions (2) Composite reactions involve more than one elementary reaction (3) Composite reactions involve only one elementary reaction (4) None of the above</p> |
| 95. | <p>The values of van der Waal's constant "a" for gases O₂, N₂, NH₃ and CH₄ are 1.36, 1.39, 4.17 and 2.253 litre² atm mole⁻² respectively. The gas which can most easily be liquified is</p> <p>(1) NH₃ (2) O₂ (3) N₂ (4) CH₄</p> |
| 96. | <p>Frenkel defect appears in crystal in which</p> <p>(1) Size of anion is equal to size of cation (2) Size of anion is less than size of cation (3) Size of anion is much larger than cation (4) None of the above</p> |

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| Question No. | Questions |
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| 97. | Molar polarization, P_m , is independent of (1) Pressure (2) Temperature (3) Concentration (4) None of these |
| 98. | At temperature near absolute zero gaseous molecules possess only (1) Translational energy (2) Rotational energy (3) Rotational and translational energy (4) Vibrational energy |
| 99. | The molecule which is IR inactive but Raman active is (1) HCl (2) N ₂ (3) SO ₂ (4) Protein |
| 100. | The cell potential is a (1) Intensive property (2) Extensive property (3) Thermodynamic property (4) Colligative property |
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|-------|-------|-------|-------|-------|-------|--------|
| 1. 1 | 16. 3 | 31. 3 | 46. 2 | 61. 3 | 76. 2 | 91. 2 |
| 2. 2 | 17. 2 | 32. 1 | 47. 4 | 62. 3 | 77. 4 | 92. 3 |
| 3. 2 | 18. 2 | 33. 1 | 48. 1 | 63. 4 | 78. 1 | 93. 4 |
| 4. 2 | 19. 3 | 34. 2 | 49. 4 | 64. 4 | 79. 2 | 94. 2 |
| 5. 1 | 20. 3 | 35. 1 | 50. 2 | 65. 3 | 80. 3 | 95. 1 |
| 6. 3 | 21. 3 | 36. 3 | 51. 4 | 66. 3 | 81. 4 | 96. 3 |
| 7. 2 | 22. 2 | 37. 3 | 52. 3 | 67. 4 | 82. 2 | 97. 2 |
| 8. 4 | 23. 4 | 38. 4 | 53. 3 | 68. 3 | 83. 1 | 98. 4 |
| 9. 2 | 24. 4 | 39. 3 | 54. 2 | 69. 2 | 84. 3 | 99. 2 |
| 10. 4 | 25. 3 | 40. 3 | 55. 2 | 70. 4 | 85. 4 | 100. 1 |
| 11. 4 | 26. 1 | 41. 2 | 56. 1 | 71. 1 | 86. 2 | |
| 12. 4 | 27. 1 | 42. 1 | 57. 1 | 72. 1 | 87. 1 | |
| 13. 2 | 28. 4 | 43. 3 | 58. 1 | 73. 2 | 88. 3 | |
| 14. 3 | 29. 2 | 44. 3 | 59. 1 | 74. 3 | 89. 4 | |
| 15. 1 | 30. 1 | 45. 2 | 60. 3 | 75. 4 | 90. 1 | |

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Thoms