

61. The correct order in which the first ionisation potential increases is
- 1) Na, K, Be
 - 2) K, Na, Be
 - 3) K, Be, Na
 - 4) Be, Na, K
62. 10 cm^3 of 0.1 N monobasic acid requires 15 cm^3 of sodium hydroxide solution whose normality is
- 1) 1.5 N
 - 2) 0.15 N
 - 3) 0.066 N
 - 4) 0.66 N
63. The IUPAC name for tertiary butyl iodide is
- 1) 4-Iodobutane
 - 2) 2-Iodobutane
 - 3) 1-Iodo, 3-methyl propane
 - 4) 2-Iodo 2-methyl propane
64. When sulphur dioxide is passed in an acidified $K_2Cr_2O_7$ solution, the oxidation state of sulphur is changed from
- 1) $+4$ to 0
 - 2) $+4$ to $+2$
 - 3) $+4$ to $+6$
 - 4) $+6$ to $+4$
65. Mass of 0.1 mole of Methane is
- 1) 1 g
 - 2) 16 g
 - 3) 1.6 g
 - 4) 0.1 g

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66. Methoxy methane and ethanol are
- 1) Position isomers
 - 2) Chain isomers
 - 3) Functional isomers
 - 4) Optical isomers
67. When the azimuthal quantum number has the value of 2, the number of orbitals possible are
- 1) 7
 - 2) 5
 - 3) 3
 - 4) 0
68. For the reaction $Fe_2O_3 + 3CO \longrightarrow 2Fe + 3CO_2$ the volume of carbon monoxide required to reduce one mole of ferric oxide is
- 1) 22.4 dm^3
 - 2) 44.8 dm^3
 - 3) 67.2 dm^3
 - 4) 11.2 dm^3
69. The monomers of Buna-S rubber are
- 1) vinyl chloride and sulphur
 - 2) butadiene
 - 3) styrene and butadiene
 - 4) isoprene and butadiene
70. An element with atomic number 21 is a
- 1) halogen
 - 2) representative element
 - 3) transition element
 - 4) alkali metal

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71. The maximum number of hydrogen bonds that a molecule of water can have is
- 1) 1
 - 2) 2
 - 3) 3
 - 4) 4
72. A gas deviates from ideal behaviour at a high pressure because its molecules
- 1) attract one another
 - 2) show the Tyndall effect
 - 3) have kinetic energy
 - 4) are bound by covalent bonds
73. The reagent used to convert an alkyne to alkene is
- 1) Zn / HCl
 - 2) Sn / HCl
 - 3) $Zn-Hg / HCl$
 - 4) Pd / H_2
74. When compared to ΔG^0 for the formation of Al_2O_3 , the ΔG^0 for the formation of Cr_2O_3 is
- 1) higher
 - 2) lower
 - 3) same
 - 4) unpredicted
75. In order to increase the volume of a gas by 10%, the pressure of the gas should be
- 1) increased by 10 %
 - 2) increased by 1 %
 - 3) decreased by 10 %
 - 4) decreased by 1 %

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76. Catalytic dehydrogenation of a primary alcohol gives a
- 1) secondary alcohol
 - 2) aldehyde
 - 3) ketone
 - 4) ester
77. Excess of PCl_5 reacts with conc. H_2SO_4 giving
- 1) chlorosulphonic acid
 - 2) thionyl chloride
 - 3) sulphuryl chloride
 - 4) sulphurous acid
78. If one mole of ammonia and one mole of hydrogen chloride are mixed in a closed container to form ammonium chloride gas, then
- 1) $\Delta H > \Delta u$
 - 2) $\Delta H = \Delta u$
 - 3) $\Delta H < \Delta u$
 - 4) there is no relationship
79. The compound on dehydrogenation gives a ketone. The original compound is
- 1) primary alcohol
 - 2) secondary alcohol
 - 3) tertiary alcohol
 - 4) carboxylic acid
80. Which is the most easily liquifiable rare gas ?
- 1) Xe
 - 2) Kr
 - 3) Ar
 - 4) Ne

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81. Mesomeric effect involves delocalisation of
- 1) π electrons
 - 2) sigma electrons
 - 3) protons
 - 4) none of these
82. Which of the following has the maximum number of unpaired 'd' electrons ?
- 1) Zn^{2+}
 - 2) Fe^{2+}
 - 3) Ni^{3+}
 - 4) Cu^{+}
83. One mole of which of the following has the highest entropy?
- 1) liquid nitrogen
 - 2) hydrogen gas
 - 3) mercury
 - 4) diamond
84. Which of the following species does not exert a resonance effect ?
- 1) $C_6H_5NH_2$
 - 2) $C_6H_5\overset{+}{N}H_3$
 - 3) C_6H_5OH
 - 4) C_6H_5Cl
85. A complex compound in which the oxidation number of a metal is zero is
- 1) $K_4[Fe(CN)_6]$
 - 2) $K_3[Fe(CN)_6]$
 - 3) $[Ni(CO)_4]$
 - 4) $[Pt(NH_3)_4]Cl_2$

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86. Three moles of PCl_5 , three moles of PCl_3 and two moles of Cl_2 are taken in a closed vessel. If at equilibrium the vessel has 1.5 moles of PCl_5 , the number of moles of PCl_3 present in it is
- 1) 5 2) 3
3) 6 4) 4.5
87. How many optically active stereomers are possible for butan-2, 3-diol ?
- 1) 1 2) 2
3) 3 4) 4
88. An octahedral complex is formed when hybrid orbitals of the following type are involved
- 1) sp^3 2) $d sp^2$
3) $d^2 sp^3$ 4) $sp^2 d^2$
89. For the reaction $2\text{HI}_{(g)} \rightleftharpoons \text{H}_{2(g)} + \text{I}_{2(g)} - Q \text{ KJ}$, the equilibrium constant depends upon
- 1) temperature 2) pressure
3) catalyst 4) volume
90. The angle strain in cyclobutane is
- 1) $24^\circ 44'$ 2) $29^\circ 16'$
3) $19^\circ 22'$ 4) $9^\circ 44'$

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91. The number of nodal planes present in σ^*s antibonding orbitals is
- 1) 1
 - 2) 2
 - 3) 0
 - 4) 3
92. Which of the following electrolytic solutions has the least specific conductance ?
- 1) 0.02 N
 - 2) 0.2 N
 - 3) 2 N
 - 4) 0.002 N
93. The overlapping of orbitals in benzene is of the type
- 1) $sp-sp$
 - 2) $p-p$
 - 3) sp^2-sp^2
 - 4) sp^3-sp^3
94. The calculated bond order of superoxide ion (O_2^-) is
- 1) 2.5
 - 2) 2
 - 3) 1.5
 - 4) 1
95. Which of the following can be measured by the Ostwald-Walker dynamic method ?
- 1) Relative lowering of vapour pressure
 - 2) Lowering of vapour pressure
 - 3) Vapour pressure of the solvent
 - 4) all of these

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96. *n*-propyl bromide on treating with alcoholic *KOH* produces
- 1) propane
 - 2) propene
 - 3) propyne
 - 4) propanol
97. Mercury is a liquid metal because
- 1) it has a completely filled *s*-orbital
 - 2) it has a small atomic size
 - 3) it has a completely filled *d*-orbital that prevents *d-d* overlapping of orbitals
 - 4) it has a completely filled *d*-orbital that causes *d-d* overlapping
98. A compound is formed by elements *A* and *B*. This crystallises in the cubic structure where the *A* atoms are at the corners of the cube and *B* atoms are at the body centres. The simplest formula of the compound is
- 1) AB
 - 2) A_6B
 - 3) A_8B_4
 - 4) AB_6
99. Anisole can be prepared by the action of methyl iodide on sodium phenate. The reaction is called
- 1) Wurtz's reaction
 - 2) Williamson's reaction
 - 3) Fittig's reaction
 - 4) Etard's reaction
100. Malleability and ductility of metals can be accounted due to
- 1) the presence of electrostatic force
 - 2) the crystalline structure in metal
 - 3) the capacity of layers of metal ions to slide over the other
 - 4) the interaction of electrons with metal ions in the lattice

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101. An ionic compound is expected to have tetrahedral structure if r_+/r_- lies in the range of
- | | |
|-------------------|-------------------|
| 1) 0.414 to 0.732 | 2) 0.225 to 0.414 |
| 3) 0.155 to 0.225 | 4) 0.732 to 1 |

102. Among the following, which is least acidic ?

- | | |
|------------------|-------------------|
| 1) phenol | 2) O-cresol |
| 3) p-nitrophenol | 4) p-chlorophenol |

103. A ligand can also be regarded as

- | | |
|---------------|------------------|
| 1) Lewis acid | 2) Bronsted base |
| 3) Lewis base | 4) Bronsted acid |

104. The colour of sky is due to

- 1) transmission of light
- 2) wavelength of scattered light
- 3) absorption of light by atmospheric gases
- 4) All of these

105. Which of the following organic compounds answers to both iodoform test and Fehling's test?

- | | |
|------------|--------------|
| 1) ethanol | 2) methanal |
| 3) ethanal | 4) propanone |

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106. Helium is used in balloons in place of hydrogen because it is

- | | |
|------------------|--------------------------------|
| 1) incombustible | 2) lighter than hydrogen |
| 3) radioactive | 4) more abundant than hydrogen |

107. The basic principle of Cottrell's precipitator is

- 1) Le-chatelier's principle
- 2) peptisation
- 3) neutralisation of charge on colloidal particles
- 4) scattering of light

108. When carbon monoxide is passed over solid caustic soda heated to 200°C , it forms

- | | |
|-----------------------------|------------------------------|
| 1) Na_2CO_3 | 2) NaHCO_3 |
| 3) HCOONa | 4) CH_3COONa |

109. $\text{N}_2 + 3\text{H}_2 \rightleftharpoons 2\text{NH}_3 + \text{heat}$. What is the effect of the increase of temperature on the equilibrium of the reaction?

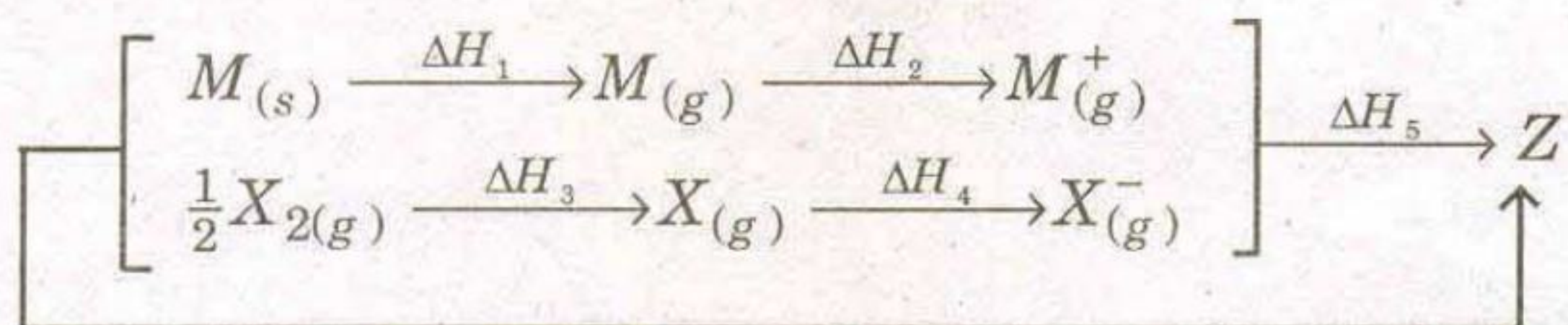
- 1) equilibrium is shifted to the left
- 2) equilibrium is shifted to the right
- 3) equilibrium is unaltered
- 4) reaction rate does not change

110. Hydrogen gas is not liberated when the following metal is added to dil. HCl

- | | |
|----------------|----------------|
| 1) Ag | 2) Zn |
| 3) Mg | 4) Sn |

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111. Consider the Born-Haber cycle for the formation of an ionic compound given below and identify the compound (Z) formed.



- | | |
|-------------|-------------------|
| 1) M^+X^- | 2) $M^-X_{(s)}^-$ |
| 3) MX | 4) $M^+X_{(g)}^-$ |

112. In the brown ring test, the brown colour of the ring is due to

- | | |
|---------------------------------|----------------------------|
| 1) ferrous nitrate | 2) ferric nitrate |
| 3) a mixture of NO and NO_2 | 4) nitrosoferrous sulphate |

113. Amines behave as

- | | |
|-----------------|---------------------|
| 1) Lewis acids | 2) Lewis base |
| 3) aprotic acid | 4) neutral compound |

114. Dalda is prepared from oils by

- | | |
|---------------|-----------------|
| 1) oxidation | 2) reduction |
| 3) hydrolysis | 4) distillation |

115. The chemical name of anisole is

- | | |
|------------------|--------------------|
| 1) Ethanoic acid | 2) Methoxy benzene |
| 3) Propanone | 4) Acetone |

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116. The number of disulphide linkages present in insulin are

- 1) 1
- 2) 2
- 3) 3
- 4) 4

117. 80 g of oxygen contains as many atoms as in

- 1) 80 g of hydrogen
- 2) 1 g of hydrogen
- 3) 10 g of hydrogen
- 4) 5 g of hydrogen

118. Which metal has a greater tendency to form metal oxide ?

- 1) *Cr*
- 2) *Fe*
- 3) *Al*
- 4) *Ca*

119. Identify the reaction that does not take place in a blast furnace.

- 1) $\text{CaCO}_3 \longrightarrow \text{CaO} + \text{CO}_2$
- 2) $\text{CaO} + \text{SiO}_2 \longrightarrow \text{CaSiO}_3$
- 3) $2\text{Fe}_2\text{O}_3 + 3\text{C} \longrightarrow 4\text{Fe} + 3\text{CO}_2$
- 4) $\text{CO}_2 + \text{C} \longrightarrow 2\text{CO}$

120. Waxes are esters of

- 1) glycerol
- 2) long chain alcohols
- 3) glycerol and fatty acid
- 4) long chain alcohols and long chain fatty acids

(Space for Rough Work)