CHEMISTRY

61. The compressibility of a gas is less than unity at STP, therefore

(a) $V_m > 22.4\,L$

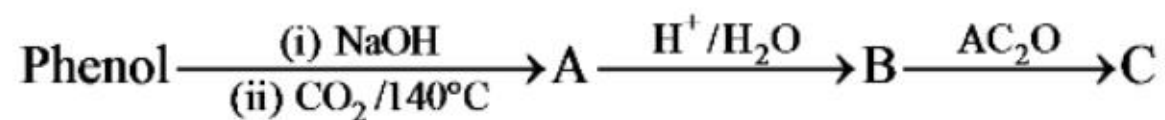(b) $V_m < 22.4\,L$

(c) $V_m = 22.4\,L$

(d) $V_m = 44.8\,L$

Answer: (b)

62. Among the following set of quantum numbers, the impossible set is

(a) n : 3; l : 2; m : 3; s : –1/2

(b) n : 4; l : 0; m : 0; s : 1/2

(c) n : 5; l : 3; m : 0; s : –1/2

(d) n : 3; l : 2; m : –2; s : 1/2

Answer: (a)

63.

$$\text{Phenol} \xrightarrow[\text{(ii) } CO_2 / 140°C]{\text{(i) NaOH}} A \xrightarrow{H^+ / H_2O} B \xrightarrow{AC_2O} C$$

In the above reaction, end product 'C' is

(a) salicylaldehyde

(b) salicylic acid

(c) phenyl acetate

(d) aspirin

Answer: (d)

64. The normality of 10% (w/v) of acetic acid is

(a) 1 N

(b) 1.3 N

(c) 1.7 N

(d) 1.9 N

Answer: (c)

65. Which of the following is least soluble in water?

(a) C_2H_6

(b) CH_3OH

(c) CH_3NH_2

(d) C_6H_5OH

Answer: (a)

66.

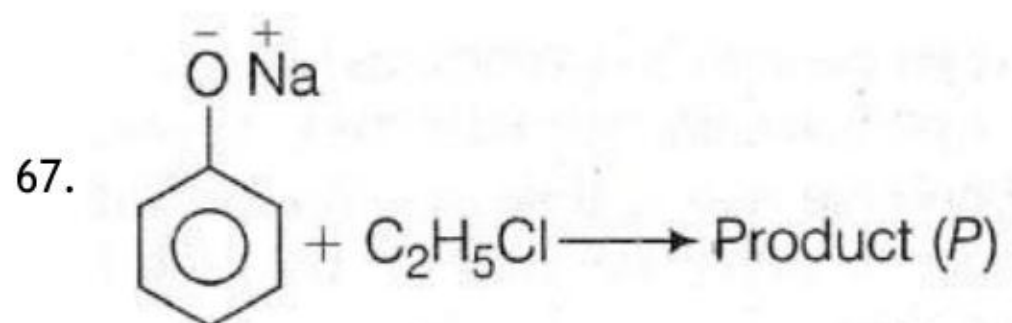$$\text{Iso} - \text{propyl chloride} + A \xrightarrow{\Delta} 2 - \text{ethoxy propane} + NaCl.$$
The compound (A) is

(a) C_2H_5Cl

(b) C_2H_5ONa

(c) CH_2N_2

(d) CH_3ONa

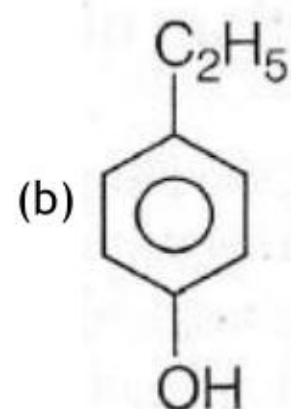**Answer: (b)**

67.

+ $C_2H_5Cl \longrightarrow$ Product (P)

The product (P) is

(a)

(b)

(c)

(d)
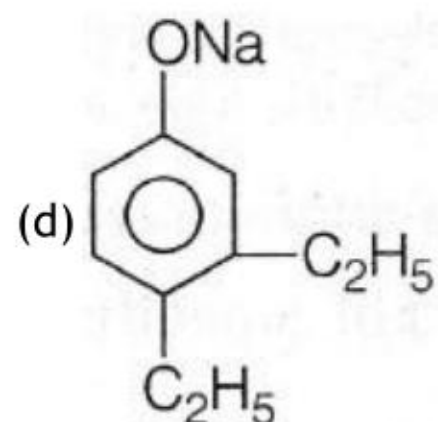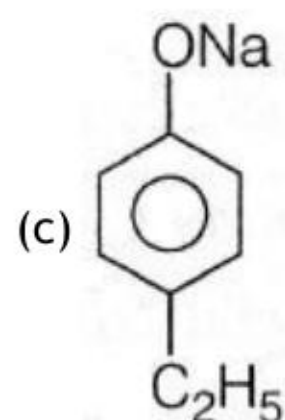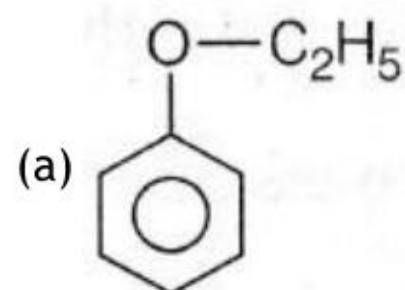
Answer: (a)

68. 1-butyne on oxidation with hot alkaline $KMnO_4$ would yield. Which of the following as end product?

(a) $CH_3CH_2CH_2COOH$

(b) CH_3CH_2COOH

(c) $CH_3CH_2COOH + CO_2 + H_2O$

(d) $CH_3CH_2COOH + HCOOH$

Answer: (c)

69. A cubic unit cell of a metal with molar mass of 63.55 g mol^{-1} has an edge length of 362 pm. Its density is 8.92 g cm^{-3}. The type of unit cell is

(a) primitive
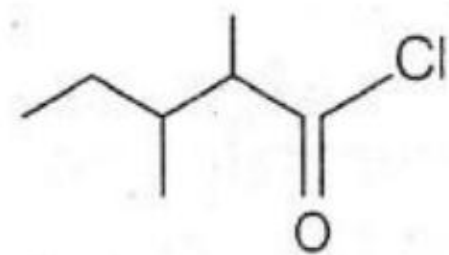
(b) face centred

(c) end centred

(d) body centred

Answer: (b)

70. Which of the following is the major product in the reaction of HOBr with propene?

(a) 2-bromo, 1-propanol

(b) 3-bromo, 1-propanol

(c) 2-bromo, 2-propanol

(d) 1-bromo, 2-propanol

Answer: (d)

71. Which of the following is the correct IUPAC name?

(a) 3, 4-dimethyl pentanoyl chloride

(b) 1-chloro-1-oxo-2, 3-dimethyl pentane

(c) 2-ethyl-3-methyl butanoyl chloride

(d) 2, 3-dimethyl pentanoyl chloride

Answer: (d)

72. Consider the following solutions,

A = 0.1 glucose, B = 0.05 M NaCl,

C = 0.05 M $BaCl_2$, D = 0.1 M $AlCl_3$

Which of the following pairs is isotonic?

(a) A and B

(b) A and D

(c) A and C

(d) B and C

Answer: (a)

73. Which of the following compound is not coloured?

(a) Na_2CuCl

(b) $Na_2Cd \cdot Cl_4$

(c) $FeSO_4$

(d) Vl_3

Answer: (b)

74. Which of the following oxide is most acidic?

(a) As_2O_3

(b) P_2O_5

(c) Sb_2O_3

(d) Bi_2O_3

Answer: (b)

75. When CO_2 is bubbled through a solution of barium peroxide in water then

(a) carbonic acid is formed

(b) O_2 is released

(c) H_2O_2 is formed

(d) no reaction occurs

Answer: (c)

76. The correct increasing order of ionic radii of the following Ce^{3+}, La^{3+}, Pm^{3+} and Yb^{3+} is

(a) $Yb^{3+} < Pm^{3+} < Ce^{3+} < La^{3+}$

(b) $Ce^{3+} < Yb^{3+} < Pm^{3+} < Ce^{3+}$

(c) $Yb^{3+} < Pm^{3+} < La^{3+} < Ce^{3+}$

(d) $Pm^{3+} < La^{3+} < Ce^{3+} < Yb^{3+}$

Answer: (a)

77. The shape of gaseous $SnCl_2$ is

(a) tetrahedral

(b) linear

(c) angular

(d) T-shape

Answer: (c)

78. Which of the following aqueous solution should have highest boiling point?

(a) 1.0 M NaOH

(b) 1.0 M Na$_2$SO$_4$

(c) 1.0 M NH$_4$NO$_3$

(d) 1.0 M KNO$_3$

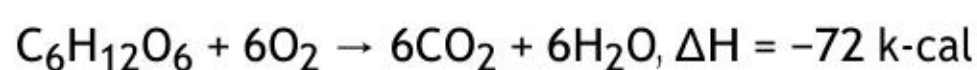**Answer: (b)**

79. When a lead storage battery is discharged;

(a) SO$_2$ is evolved

(b) lead sulphate is consumed

(c) lead is formed

(d) sulphuric acid is consumed

Answer: (d)

80. Combustion of glucose takes place according to the equation,

C$_6$H$_{12}$O$_6$ + 6O$_2$ → 6CO$_2$ + 6H$_2$O, ΔH = −72 k-cal

The energy required for combustion of 1.6 g of glucose is

(a) 0.064 k-cal

(b) 0.64 k-cal

(c) 6.4 k-cal

(d) 64 k-cal

Answer: (b)

81. When the heat of reaction at constant pressure is −5 × 10^3 cal and entropy change is 7.4 cal deg^{-1} at 25°C, the reaction is predicted as

(a) reversible

(b) spontaneous

(c) non-spontaneous

(d) irreversible

Answer: (b)

82. Which of the following is not expected to show paramagnetism?

(a) $[Ni(H_2O)]^{2+}$

(b) $Ni(CO)_4$

(c) $[Ni(NH_3)_4]^{2+}$

(d) $[Co(NH_3)_6]^{2+}$

Answer: (b)
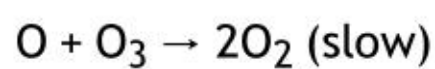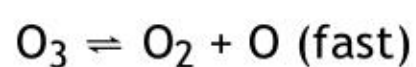
83. In which of the following compounds, sulphur show maximum oxidation number?

(a) H_2SO_4

(b) SO_3

(c) $H_2S_2O_7$

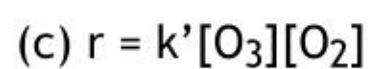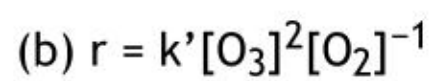(d) All have same oxidation number for sulphur

Answer: (d)

84. For the chemical reaction, $2O_3 \rightleftharpoons 3O_2$

The reaction proceed as follows

$O_3 \rightleftharpoons O_2 + O$ (fast)

$O + O_3 \rightarrow 2O_2$ (slow)

The rate law expression will be

(a) $r = k'[O_3]^2$

(b) $r = k'[O_3]^2[O_2]^{-1}$
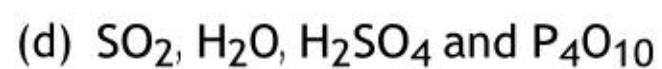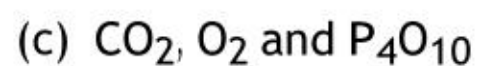
(c) $r = k'[O_3][O_2]$

(d) Unpredictable

Answer: (b)

85. Which of the following is the correct order of stability for the given superoxides?

(a) $KO_2 > RbO_2 < CsO_2$

(b) $CsO_2 < RbO_2 < KO_2$

(c) $RbO_2 < CsO_2 < KO_2$

(d) $KO_2 < CsO_2 < RbO_2$
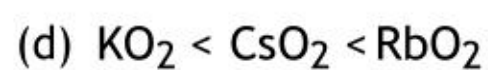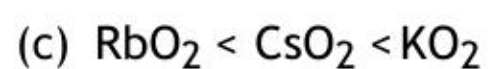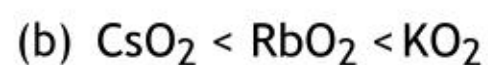
Answer: (a)

86. Among the following compounds, which will produce $POCl_3$ with PCl_5.

(a) Only O_2

(b) O_2 and CO_2

(c) CO_2, O_2 and P_4O_{10}

(d) SO_2, H_2O, H_2SO_4 and P_4O_{10}
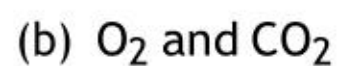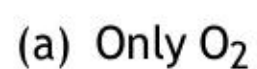
Answer: (d)

87. In the following graph.
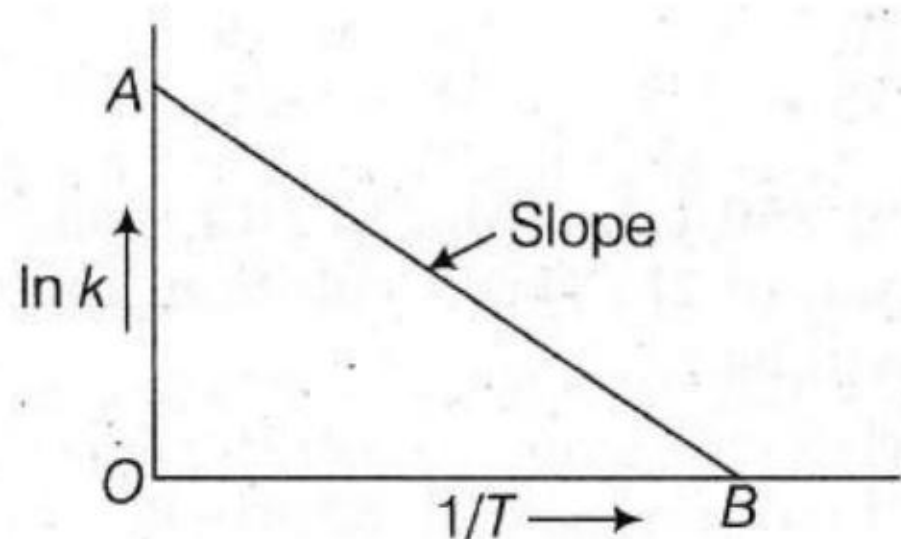
The slope of line AB gives the information of

(a) value of $\dfrac{E_a}{2.303}$

(b) value of $\dfrac{2.303}{E_a}$

(c) value of $-\dfrac{E_a}{2.303\,R}$

(d) value of $-\dfrac{E_a}{2.303\,RT}$

Answer: (c)

88. Among the following compounds, which compound is polar as well as exhibit sp^2-hyrbidization by the central atom

(a) H_2CO_3

(b) SiF_4

(c) BF_3

(d) $HClO_3$

Answer: (a)

89. Which one among the following is added to soap to impart antiseptic property?

(a) Sodium lauryl sulphate

(b) Sodium dodecyl benzene sulphonates

(c) Rosin

(d) Bithional

Answer: (d)

90. How many Faradays are required to reduce 1 mol of BrO_3^- to Br^-.

(a) 3

(b) 5

(c) 6

(d) 4

Answer: (c)

91. The energy released when 6 moles of octane is burnt in air will be [Given, ΔH_f for $CO_2(g)$, $H_2O(g)$ and $C_8H_8(l)$, respectively are −490, −240 and +160 J/mol]

(a) −37.4 kJ

(b) −20 kJ

(c) −6.2 kJ

(d) −35.5 kJ

Answer: (d)

92. When I^- is oxidized by MnO_4^- in alkaline medium, I^- converts into

(a) IO_3^-

(b) I_2

(c) IO_4^-

(d) IO^-

93. The value of reaction quotient (Q), for the following cell

Zn(s) $|Zn^{2+}(0.01\,M)|\,|\,Ag^+\,(1.25\,M)\,|\,Ag\,(s)$ is

(a) 156

(b) 125

(c) 1.25×10^{-2}

(d) 6.4×10^{-3}

94. When 750 mL of 0.5 M HCl is mixed with 250 mL of 2M NaOH solution, the value of pH will be

(a) pH = 7

(b) pH > 7

(c) pH < 7

(d) pH = 0

95. The most stable carbonium ion among the following is

(a) $C_6H_5-CH_2\overset{+}{C}H_2$

(b) $CH_3\overset{+}{C}H_2$

(c) $C_6H_5-\overset{+}{C}-C_6H_5$

(d) $C_6H_5\overset{+}{C}H_2$

Answer: (c)

96. Which of the following is not applicable to the phenomenon of adsorption?

(a) $\Delta H > 0$
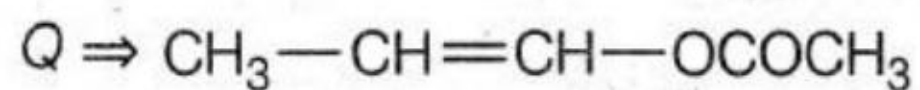
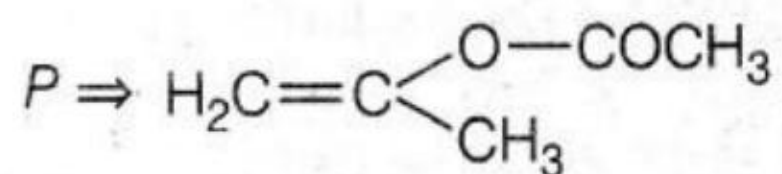(b) $\Delta G < 0$

(c) $\Delta S < 0$

(d) $\Delta H < 0$

Answer: (d)

97. In cyamide extraction process of silver from argentite ore, the oxidizing and reducing agents are respectively.

(a) O_2 and CO_2

(b) O_2 and Zn dust

(c) HNO_3 and Zn dust

(d) HNO_3 and CO

Answer: (b)

98. The product of acid hydrolysis of (P) and (Q) can be distinguished by

$$P \Rightarrow H_2C\text{=}C\!\!\begin{array}{l}\diagup O\text{—}COCH_3 \\ \diagdown CH_3\end{array}$$

$$Q \Rightarrow CH_3\text{—}CH\text{=}CH\text{—}OCOCH_3$$

(a) Lucas reagent

(b) 2, 4-DNP

(c) Fehling's solution

(d) $NaHSO_3$

Answer: (c)

99. Clemmensen reaction of ketone is carried out in the presence of

(a) $LiAlH_4$

(b) Zn-Hg with HCl

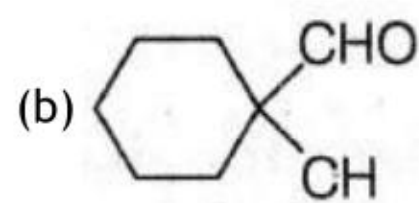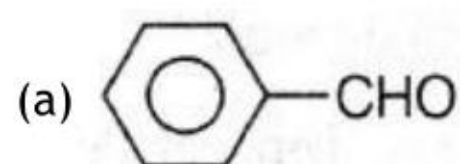(c) glycol with KOH

(d) H_2 with Pt as catalyst

Answer: (b)

100. The standard reduction potential for Zn^{2+}/Zn, Ni^{2+}/Ni and Fe^{2+}/Fe are –76, –0.23 and –0.44 V, respectively.

The reaction $X + Y^{2+} \rightarrow X^{2+} + Y$ will be spontaneous when

(a) X = Ni, Y = Fe

(b) X = Ni, Y = Zn

(c) X = Fe, Y = Zn

(d) X = Zn, Y = Ni

Answer: (d)

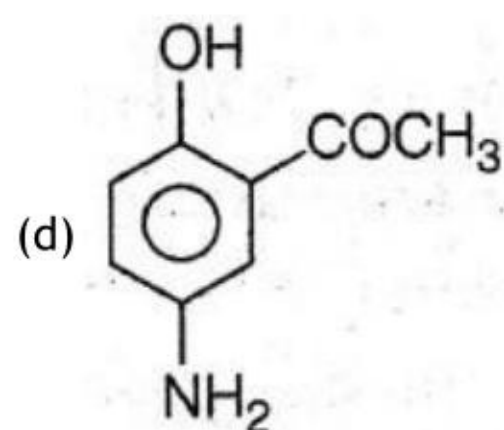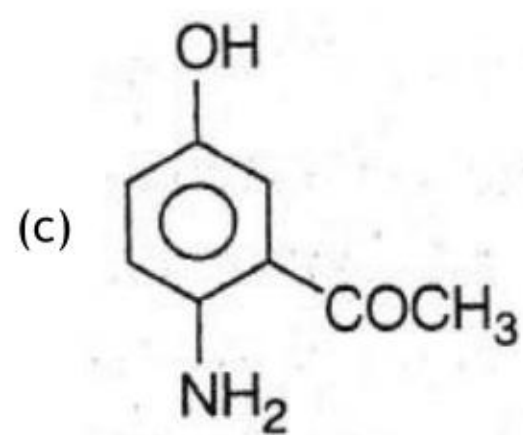101. Cannizzaro reaction is not shown by

(a) —CHO

(b)

(c) CH_3CHO

(d) HCHO

Answer: (c)

102. The main product formed in the following reaction is

HO—⟨O⟩—NH₂ + CH₃COCl

                        (1 equivalent)⟶ Product.

(a) HO—⟨O⟩—NHCOCH₃

(b) CH₃COO—⟨O⟩—NH₂

(c)

    OH
    |
  ⟨O⟩—COCH₃
    |
   NH₂

(d)

    OH
    |
  ⟨O⟩COCH₃
    |
   NH₂
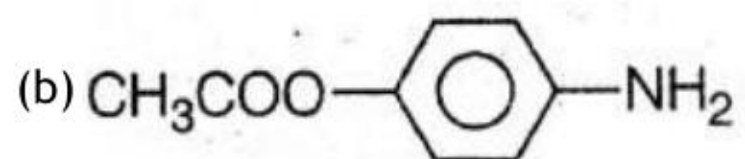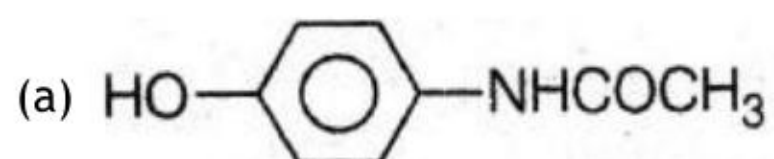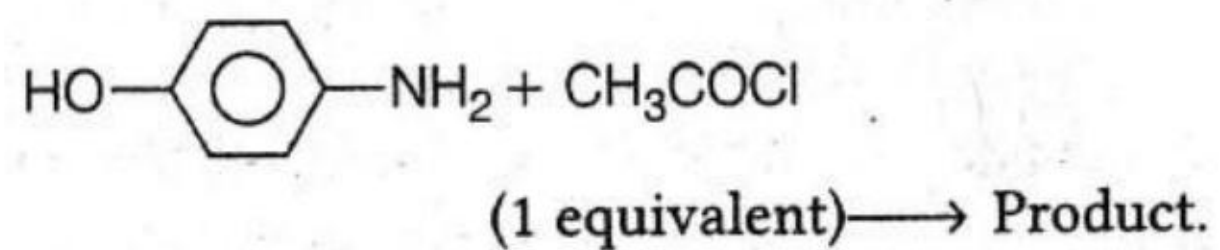
Answer: (a)

103. The correct order of basic strength of the following are

(a)

(b)

(c)

(d)
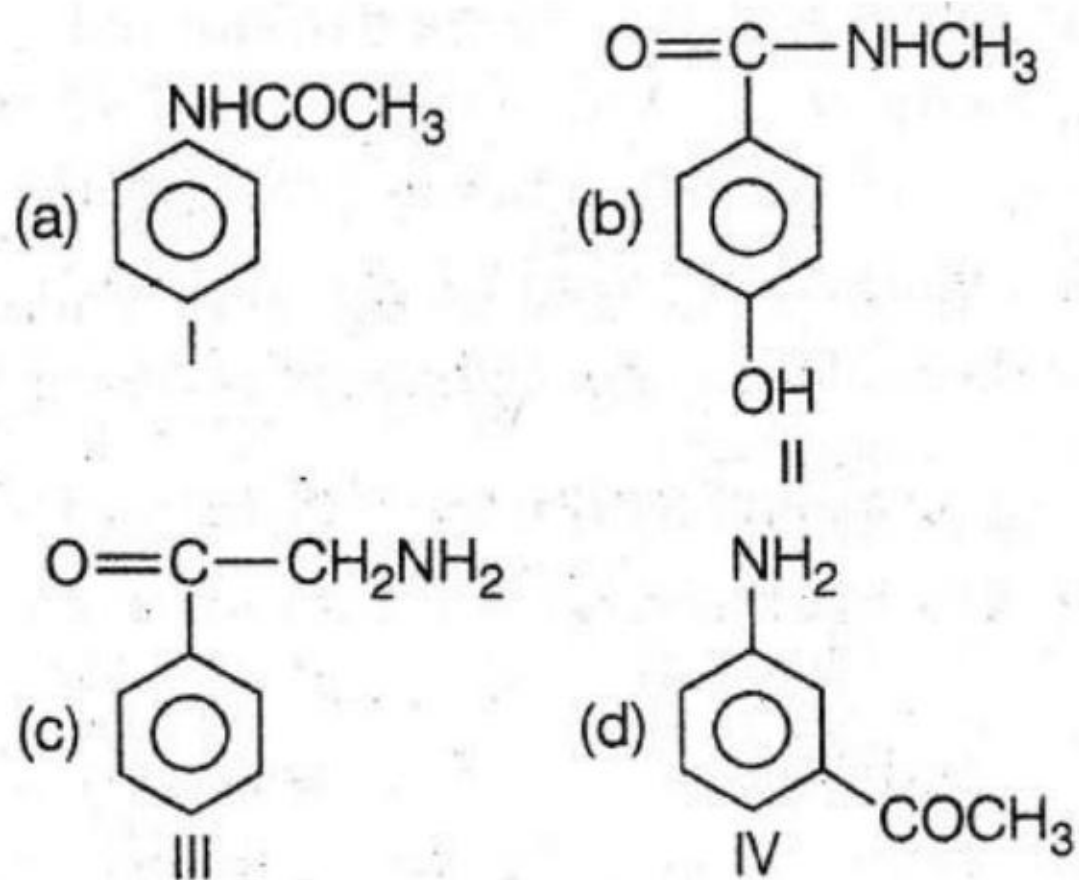
(a) I > II > III > IV

(b) IV > II > III > I

(c) III > IV > II > I

(d) III > II > IV > I

Answer: (d)

104. In the reaction,
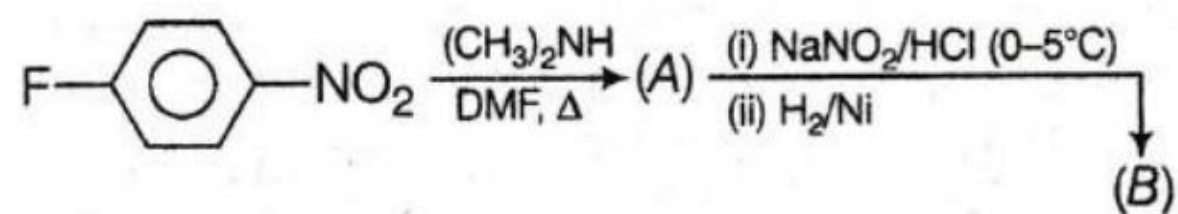
In the given reaction (B) is

(a)

(b)

(c)

(d)
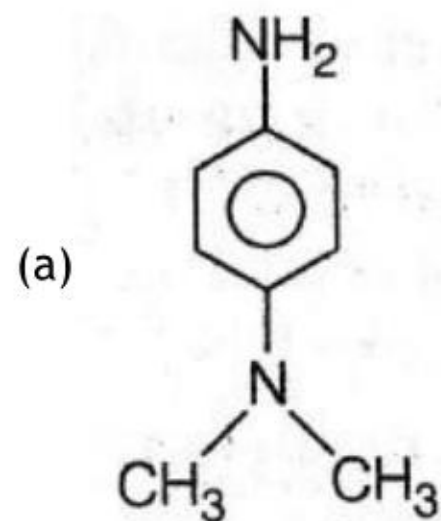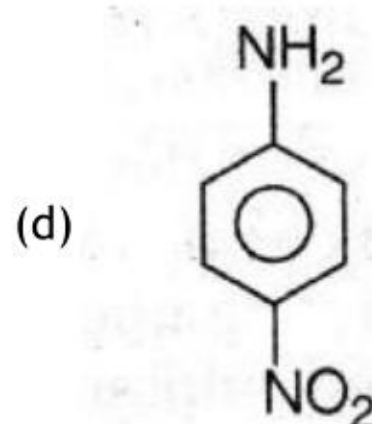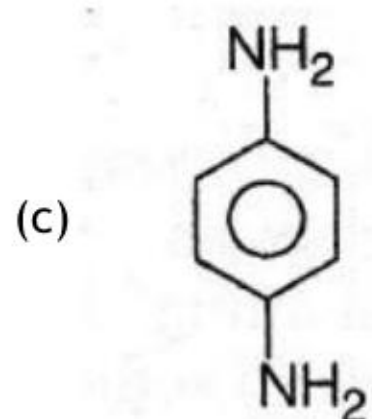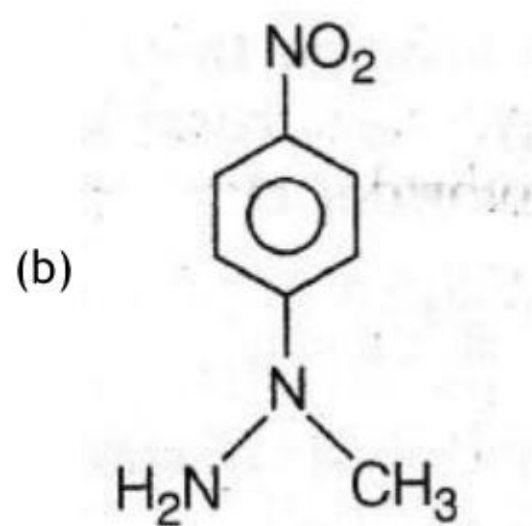
Answer: (a)

105. Polymer formation from monomers starts by

(a) condensation reaction between monomers

(b) coordination reaction between monomers

(c) conversion of one monomer into other monomer

(d) hydrolysis of monomers

Answer: (a)

106. Match the type of series given in Column I with the wavelength range given in Column II and choose the correct option.

	Column I		Column II
A.	Lyman	1.	Ultraviolet
B.	Paschen	2.	Near infrared
C.	Balmer	3	Far infrared
D.	Pfund	4.	Visible

(a) A – 1; B – 2; C – 4; D – 3

(b) A – 4; B – 3; C – 1; D – 2

(c) A – 3; B – 1; C – 2; D – 4

(d) A – 4; B – 3; C – 2; D – 1

Answer: (a)

107. Which of the following coordination compounds would exhibit optical isomerism?

(a) Pentamminenitrocobalt (III) iodide

(b) *Tris*-(ethylenediamine) cobalt (III) bromide

(c) *Trans*-dicyanobis (ethylenediamine)

(d) Diamminedinitroplatisum (II)

Answer: (b)

108. The electrons identified by quantum numbers n and l, are as follows

(I) n = 4, l = 1

(II) n = 4, l = 0

(III) n = 3, l = 2

(IV) n = 3, l = 1

If we arrange them in order of increasing energy, i.e. from lowest to highest, the correct order is

(a) IV < II < III < I

(b) II < IV < I < III

(c) I < III < II < IV

(d) III < I < IV < II

Answer: (a)

109. On hydrolysis of starch, we finally get

(a) glucose

(b) fructose

(c) Both (a) and (b)

(d) sucrose

Answer: (a)

110. Which of the following sodium compound/compound(s) are formed when an organic compound containing both nitrogen and sulphur is fused with sodium?

(a) Cyanide and sulphide

(b) Thiocyanate

(c) Sulphite and cyanide

(d) Nitrate and sulphide

Answer: (b)

111. Which of the following region is coldest?

(a) Stratosphere

(b) Troposphere

(c) Mesosphere

(d) Thermosphere

Answer: (c)

112. A solid AB has NaCl structure. If the radius of cation A^+ is 170 pm, then the maximum possible radius of the anion B^- is

(a) 397.4 pm

(b) 347.9 pm

(c) 210.9 pm

(d) 410.6 pm

Answer: (d)

113. A first order reaction is 50% completed in 1.26×10^{14} How much time would it takes for 100% completion?

(a) 1.26×10^{15} s

(b) 2.52×10^{14} s

(c) 2.52×10^{28} s

(d) Infinite

Answer: (d)

114. Flux is used to

(a) remove all type of impurities

(b) reduce metal oxide

(c) remove carbonate and sulphate

(d) remove silica and undesirable metal oxides

Answer: (d)

115. Sulphur reacts with chlorine in 1 : 2 ratio and forms X. Hydrolysis of X gives a sulphur compound Y. The hybridization of central atom in the anion Y is

(a) sp^3

(b) sp^2

(c) sp^3d

(d) sp

Answer: (a)

116. Aqueous 10% $NaHCO_3$ solution is used as a reagent for identifying 'A'. Which of the following compounds yield 'A' on hydrolysis?

(a) $CH_3COOC_2H_5$

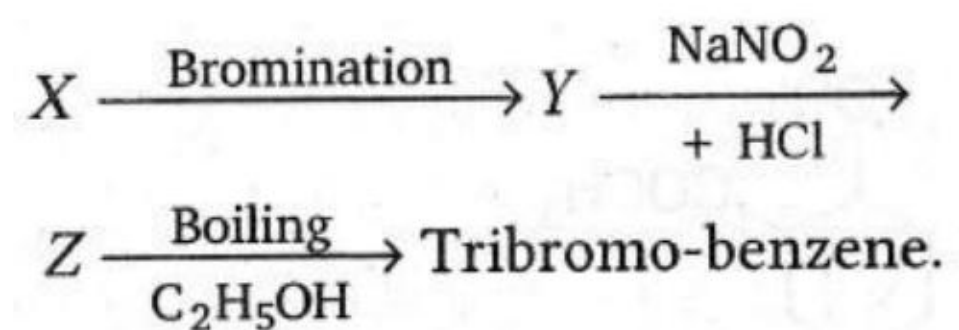(b) $C_2H_5 - COO - C_2H_5$

(c) CH_3CHO

(d) CH_3CH_2OH

Answer: (a)

117. Which of the following fibres is made of polyamides?

(a) Dacron

(b) Orion

(c) Nylon

(d) Rayon

Answer: (c)

118. Consider the following reaction,

$$X \xrightarrow{\text{Bromination}} Y \xrightarrow[\text{+ HCl}]{\text{NaNO}_2}$$

$$Z \xrightarrow[\text{C}_2\text{H}_5\text{OH}]{\text{Boiling}} \text{Tribromo-benzene.}$$

X is

(a) benzoic acid

(b) salicylic acid

(c) phenol

(d) aniline

Answer: (d)

119. The volume of water to be added to 100 cm^3 of 0.5 N H_2SO_4 to get decinormal concentration is

(a) 100 cm^3

(b) 450 cm^3

(c) 500 cm^3

(d) 400 cm^3

Answer: (d)

120. In which of the following the oxidation number of oxygen has been arranged in increasing order?

(a) $BaO_2 < KO_2 < O_3 < OF_2$

(b) $OF_2 < KO_2 < BaO_2 < O_3$

(c) $BaO_2 < O_3 < OF_2 < KO_2$

(d) $KO_2 < OF_2 < O_3 < BaO_2$

Answer: (a)