

## Chemistry

51. The antibiotic that contains arsenic is

- (a) prontosil
- (b) ofloxacin
- (c) biothionol
- (d) salvarsan

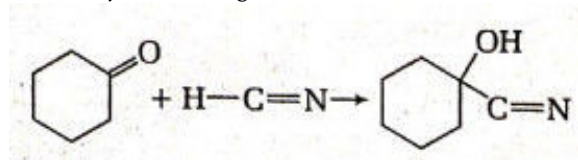
Correct: d

52. Pick out the electrophiles from the following  $\text{BF}_3$ ,  $\text{NH}_3$ ,  $\text{Me}_3\text{C}^\oplus$ ,  $\text{HCl}$

- (a)  $\text{BF}_3$ , and  $\text{NH}_3$
- (b)  $\text{Me}_3\text{C}^\oplus$  and  $\text{HCl}$
- (c)  $\text{BF}_3$  and  $\text{Me}_3\text{C}^\oplus$
- (d)  $\text{NH}_3$  and  $\text{HCl}$

Correct: c

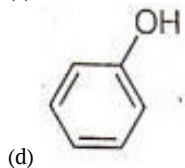
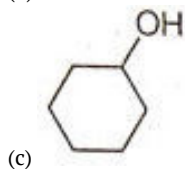
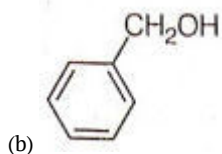
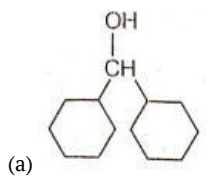
53. Classify the following reactions



- (a) Substitution
- (b) Addition
- (c) Elimination
- (d) Rearrangement

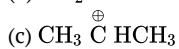
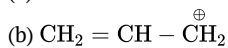
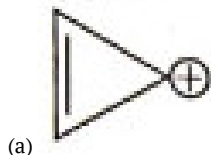
Correct: b

54. Which of the following compounds has the most acidic nature?



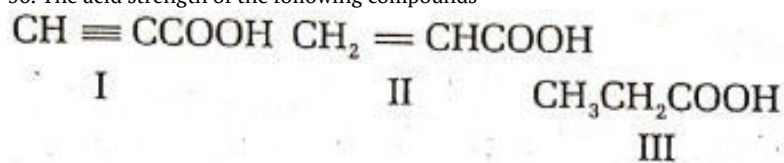
Correct: d

55. The most stable carbocation is



Correct: a

56. The acid strength of the following compounds



is in the order

- (a)  $\text{II} > \text{I} > \text{III}$   
 (b)  $\text{III} > \text{II} > \text{I}$   
 (c)  $\text{I} > \text{III} > \text{II}$   
 (d)  $\text{I} > \text{II} > \text{III}$

Correct: d

57. Which of the following radioactive element is used in the treatment of cancer?

- (a) Uranium  
 (b) Thorium  
 (c) Cerium  
 (d) Plutonium

Correct: b

58. p-hydroxyazobenzene is

- (a) an orange dye  
 (b) a yellow dye  
 (c) a red dye  
 (d) an orange-red dye

Correct: a

59. Which one of the following compounds can exist in Zwitter ionic form?

- (a) Amino acid
- (b) Fat
- (c) Carbohydrate
- (d) Alcohol

Correct: a

60. The following reaction



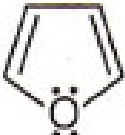


is known as

- (a) Frankland reaction
- (b) Swarts reaction
- (c) Etard reaction
- (d) Finkelstein reaction

Correct: d

61. Which of the following is aromatic compounds?

- (a) 
- (b) 
- (c) 
- (d) All of these

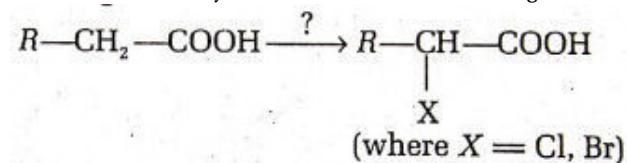
Correct: d

62. Nylon 6 is obtained by the condensation of

- (a) Terephthalic acid and ethylene glycol
- (b) Adipic acid and styrene
- (c) Caprolactum with water at high temperature
- (d) Phenol and formaldehyde

Correct: c

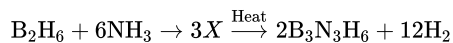
63. Mention the catalyst and reaction condition in the given reaction



- (a)  $X_2$ / grey phosphorus,  $H_2O$
- (b)  $X_2$ / red phosphorus,  $H_2O$
- (c)  $X_2$ / white phosphorus,  $H_2O$
- (d)  $X_2$ / blue phosphorus,  $H_2O$

Correct: b

64. The intermediate product (X) formed in the following reaction is



- (a)  $[\text{BH}(\text{NH}_3)_3]^+ [\text{BH}_4]^-$   
 (b)  $[\text{BH}_2\text{OH}_3)_4]^+ [\text{BH}_4]$   
 (c)  $[\text{BH}(\text{NH}_3)_4]^+ [\text{BH}_4]$   
 (d)  $[\text{BH}_2(\text{NH}_3)_2]^+ \cdot [\text{BH}_4]$

Correct: d

65. DDT is

- (a) 2,2-di (p-chlorophenyl) - 1, 1, 1-trichloroethane  
 (b) 2,2-di (m-chlorophenyl) - 1, 1, 1-trichloroethane  
 (c) 2,2-di (o-chlorophenyl) - 1, 1, 1-trichloroethane  
 (d) 2,2-di (o-chlorophenyl) - 1, 1-dichloroethane

Correct: a

66. The carbocation formed in  $\text{S}_{\text{N}}1$  reaction of alkyl halide in the slow step is:

- (a)  $sp^3$ -hybridised  
 (b)  $sp^2$ -hybridised  
 (c) sp-hybridised  
 (d)  $sp^3d$ - hybridised

Correct: b

67. Which of the followings is invert sugar?

- (a) Sucrose  
 (b) Cellulose  
 (c) Glucose  
 (d) Fructose

Correct: a

68. Select the correct ground state electronic configuration

- |                         |                              |                         |
|-------------------------|------------------------------|-------------------------|
| Cr                      | Eu                           | $\text{Ti}^{2+}$        |
| (a)                     |                              |                         |
| $[\text{Ar}] 3d^5 4s^1$ | $[\text{Xe}] 4f^7 5d^0 6s^2$ | $[\text{Ar}] 3d^2 4s^0$ |
| (b)                     |                              |                         |
| $[\text{Ar}] 3d^4 4s^2$ | $[\text{Xe}] 4f^7 5d^0 6s^2$ | $[\text{Ar}] 3d^2 4s^2$ |
| (c)                     |                              |                         |
| $[\text{Ar}] 3d^4 4s^2$ | $[\text{Xe}] 4f^6 5d^1 6s^2$ | $[\text{Ar}] 4s^2 4d^0$ |
| (d)                     |                              |                         |
| $[\text{Ar}] 3d^5 4s^1$ | $[\text{Xe}] 3f^6 5d^2 6s^1$ | $[\text{Ar}] 4s^1 3d^1$ |

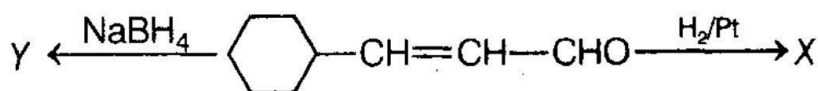
Correct: a

69. Which of the following complexes can also represent facial (fac) and meridional (mer) isomers?

- (a)  $[\text{Co}(\text{NH}_3)_3\text{NO}_2\text{Cl}]$   
 (b)  $[\text{Co}(\text{NH}_3)_2(\text{NO}_2)_2\text{Cl}_2]$   
 (c)  $[\text{Co}(\text{NH}_3)_2(\text{NO}_2)_2\text{C}_2]$   
 (d)  $[\text{Co}(\text{NH}_3)_3(\text{NO}_2)_3]$

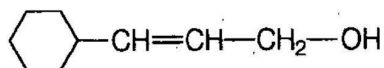
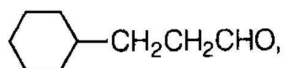
Correct: d

70.

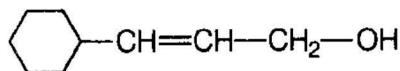
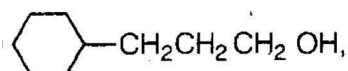


What are 'X' and 'Y'?

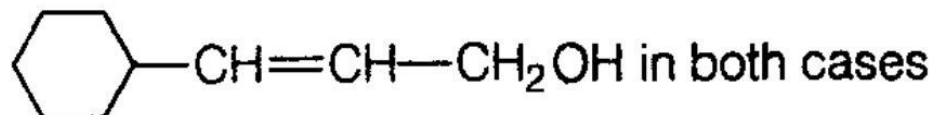
- (a)



(b)

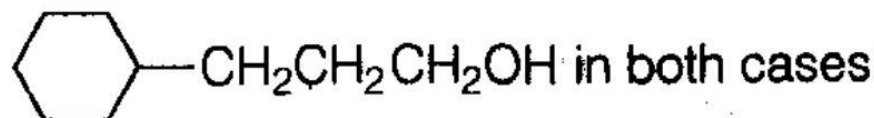


(c)



in both cases

(d)



in both cases

Correct: b

71. The purple colour of  $\text{KMnO}_4$  can be attributed to

- (a) d-d transitions
- (b) charge transfer transition
- (c) n -  $\pi$  transitions
- (d) None of these

Correct: b

72. The spin only magnetic moment ( $\mu_s$ ) of a complex  $[\text{Mn}(\text{Br}_4)]^{4-}$  is 5.9 BM. The geometry of the complex will be

- (a) tetrahedral
- (b) square planar
- (c) square pyramidal
- (d) tetragonal

Correct: a

73. Which of the following complexes would give white precipitate with excess of  $\text{AgNO}_3$  sol?

- (a)  $[\text{CO}(\text{NH}_3)_2\text{C}_2]\text{NO}_3$
- (b)  $[\text{CO}(\text{NH}_3)_5\text{SO}_4]\text{Cl}$
- (c)  $[\text{CO}(\text{NH}_3)_4\text{Cl}_2]$
- (d)  $[\text{CO}(\text{NH}_3)_5\text{NO}_3]\text{NO}_3$

Correct: b

74. Which of the following complexes does not show geometrical isomerism?

- (a)  $[\text{Pt}(\text{NH}_3)_2\text{Cl}_2]$
- (b)  $[\text{CO}(\text{NH}_3)_4\text{Cl}_2]$
- (c)  $[\text{COCl}_2(\text{en})_2]$
- (d)  $[\text{Ni}(\text{CO})_4]$

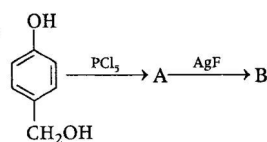
Correct: d

75. The molecule which is linear is

- (a)  $\text{N}_2\text{O}$
- (b)  $\text{NO}_2$
- (c)  $\text{SO}_2$
- (d)  $\text{H}_2\text{O}$

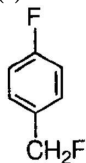
Correct: a

76.

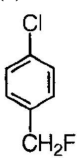


What is B in the above scheme?

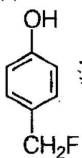
(a)



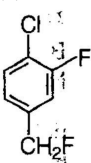
(b)



(c)



(d)



Correct: c

77. Chemical formula for 'inorganic benzene' is

(a)  $B_3N_3H_2Cl_3$

(b)  $(BN)_x$

(c)  $B_3N_3H_6$

(d)  $B_3P_3H_6$

Correct: c

78. Among  $\text{LiCl}$ ,  $\text{RbCl}$ ,  $\text{BeCl}_2$ ,  $\text{MgCl}_2$  the compounds which greater and least ionic character respectively are

(a)  $\text{LiCl}$  and  $\text{RbCl}$

(b)  $\text{RbCl}$  and  $\text{BeCl}_2$

(c)  $\text{RbCl}$  and  $\text{MgCl}_2$

(d)  $\text{MgCl}_2$  and  $\text{BeCl}_2$

Correct: b

79. Which of the following statements is false for alkali metals?

(a) Lithium is the strongest reducing agent

(b) Na is amphoteric in nature

(c)  $\text{Li}^+$  is exceptionally small

(d) All alkali metals give blue solution in liq. Ammonia

Correct: b

80. The correct order of bond angles (smallest first) in  $\text{H}_2\text{S}$ ,  $\text{NH}_3$ ,  $\text{BF}_3$  and  $\text{SiH}_4$  is

(a)  $\text{H}_2\text{S} < \text{SiH}_4 < \text{NH}_3 < \text{BF}_3$

(b)  $\text{NH}_3 < \text{H}_2\text{S} < \text{SiH}_4 < \text{BF}_3$

(c)  $\text{H}_2\text{S} < \text{NH}_3 < \text{SiH}_4 < \text{BF}_3$

(d)  $\text{H}_2\text{S} < \text{NH}_3 < \text{BF}_3 < \text{SiH}_4$

Correct: c

81. The number of P-O-P bonds in cyclic metaphosphoric acid is

- (a) zero
- (b) two
- (c) three
- (d) four

Correct: c

82. Among the trihalides of nitrogen which one is the least basic

- (a)  $\text{NF}_3$
- (b)  $\text{NCl}_3$
- (c)  $\text{NBr}_3$
- (d)  $\text{NI}_3$

Correct: a

83. Among the following, the pair in which the two species are not isostructural is

- (a)  $\text{SiF}_4$  and  $\text{SF}_6$
- (b)  $\text{IO}_4^-$  and  $\text{XeO}_4$
- (c)  $\text{BH}_3$  and  $\text{NH}_3$
- (d)  $\text{PF}_6^-$  and  $\text{SF}_6$

Correct: a

84. The hybridisation and geometry of B and N in  $[\text{H}_3\text{B} \leftarrow \text{NH}_3]$  are, respectively

- (a)  $\text{sp}^3$ , tetrahedral and  $\text{sp}^3$  pyramidal
- (b)  $\text{sp}^3$ , pyramidal and  $\text{sp}^3$  tetrahedral
- (c)  $\text{sp}^3$ , pyramidal and  $\text{sp}^3$  pyramidal
- (d)  $\text{sp}^3$ , tetrahedral and  $\text{sp}^3$  tetrahedral

Correct: c

85. Permanganate ions are

- (a) tetrahedral and paramagnetic
- (b) tetrahedral and diamagnetic
- (c) octahedral and paramagnetic
- (d) octahedral and diamagnetic

Correct: b

86. The half-life period of a radioactive element is 140 days. After 700 days, 1 g of the element will reduce to

- (a)  $\left(\frac{1}{2}\right) g$
- (b)  $\left(\frac{1}{4}\right) g$
- (c)  $\left(\frac{1}{8}\right) g$
- (d)  $\left(\frac{1}{32}\right) g$

Correct: d

87. There are certain properties related to adsorption:

- I. reversible
- II. formation of unimolecular layer
- III. low heat of adsorption
- IV. occurs at low temperature and decreases with increasing temperature.

Which of the above properties are for physical adsorption?

- (a) I, II, III
- (b) I, III, IV
- (c) II, III, IV
- (d) I, III

Correct: b

88. Which for the following FCC structures contains cations in the alternate tetrahedral voids

- (a)  $\text{Na}_2\text{O}$
- (b)  $\text{ZnS}$
- (c)  $\text{CaF}_2$
- (d)  $\text{CaO}$

Correct: b

89. One litre of water ( molecular weight 18.06) weighs 0.9970 kg. The degree of ionisation of water is ....., if  $K_w = 1.10 \times 10^{-14}$  at  $25^\circ\text{C}$
- (a)  $1.05 \times 10^{-7}$
  - (b)  $1.9 \times 10^{-9}$
  - (c)  $101 \times 10^{-11}$
  - (d)  $452 \times 10^{-7}$

Correct: b

90. The specific conductance of 0.01 M solution of acetic acid was found to be  $0.0163\text{Sm}^{-1}$  at  $25^\circ\text{C}$ . Molar conductance of acetic acid at infinite dilution is  $390.7 \times 10^{-4}\text{Sm}^2\text{mol}^{-1}$  at  $25^\circ\text{C}$ . What will be the degree of dissociation of  $\text{CH}_3\text{COOH}$ ?
- (a) 0.4072
  - (b) 0.7402
  - (c) 0.2720
  - (d) 0.0472

Correct: d

91. For the cell  $\text{Ag}(s) | \text{Ag}^+(aq) || \text{Cu}^{2+}(aq) | \text{Cu}(s)$ , the reduction potentials of the left and right hand electrodes are 0.337 and 0.799 volts, the cell emf is
- (a) - 1.136 volt
  - (b) 1.136 volt
  - (c) - 0.462 volt
  - (d) 0.462 volt

Correct: d

92. 50% of a first order reaction is complete in 23 minutes. Calculate the time required to complete 90% of the reaction
- (a) 70.4 minutes
  - (b) 76.4 minutes
  - (c) 38.7 minutes
  - (d) 35.2 minutes

Correct: b

93. The emf of the cell,  $|\text{CdCl}_2(\text{solution}) (1 \text{ atm}) | \text{AgCl}(s) | \text{Ag}$  is 0.675 at  $25^\circ\text{C}$ . The temperature coefficient of the cell is  $-6.5 \times 10^{-4}\text{V degree}^{-1}$ . Find the change in the heat content ( $\text{kJmol}^{-1}$ ) and entropy ( $\text{V deg}^{-1}$ ) for the electrochemical reaction that occurs when 1 F of electricity is drawn for it
- (a) 78.34, 83.83
  - (b) +62.43, 83.83
  - (c) -62.73, -83.83
  - (d) -78.34, +83.83

Correct: c

94. 30.4 kJ is required to melt one mole of NaCl. The entropy change during melting is  $28.4\text{Jmol}^{-1}\text{K}^{-1}$ . What is the melting point of sodium chloride?
- (a) 1070.4 K
  - (b) 535.2 K
  - (c) 273.1 K
  - (d) 1007.4 K

Correct: a

95. What weight of HCl is present in 155 ml of a 0.54 M solution?
- (a) 3.06 g
  - (b) 6.12 g
  - (c) 1.53 g
  - (d) 0.30 g

Correct: a

96. When  $\text{PCl}_5$ , is heated it gasifies and dissociates into  $\text{PCl}_3$  and  $\text{Cl}_2$ . The density of the gas mixture at  $200^\circ\text{C}$  is 70.2. What is the degree of dissociation of  $\text{PCl}_5$  at  $200^\circ\text{C}$ .
- (a) 0.485
  - (b) 0.242



- (c) 0.845
- (d) 0.542

Correct: a

97. What is the value of  $K_{sp}$ , for bismuth sulphide ( $\text{Bi}_2\text{S}_3$ ) which has a solubility of  $1.0 \times 10^{-15}$  mol/L at  $25^\circ\text{C}$ ?

- (a)  $1.08 \times 10^{-73}$
- (b)  $1.08 \times 10^{-74}$
- (c)  $1.08 \times 10^{-72}$
- (d)  $1.08 \times 10^{-75}$

Correct: a

98. At  $20^\circ\text{C}$  the solubility of  $\text{N}_2$  gas in water is 0.015 g/L when the partial pressure of  $\text{N}_2$ , is 580 torr. What is the solubility of  $\text{N}_2$  in  $\text{H}_2\text{O}$  at  $20^\circ\text{C}$  when its partial pressure is 800 torr?

- (a) 0.207 g/L
- (b) 0.0207 g/L
- (c) 0.414 g/L
- (d) 0.0414 g/L

Correct: b

99. Which of the following is incorrect?

- (a) Chemisorption is caused by bond formation
- (b) Chemisorption is reversible process
- (c) Chemisorption is specific in nature
- (d) Chemisorption increases with increase in temperature

Correct: b

100. When a mixture of 10 moles of  $\text{SO}_2$  and

16 moles of  $\text{O}_2$  were passed over a catalyst, 8 moles of  $\text{SO}_3$  were formed at equilibrium. The number of moles of  $\text{SO}_2$  and  $\text{O}_2$  remaining unreacted were

- (a) 2, 12
- (b) 12, 2
- (c) 3, 10
- (d) 10, 3

Correct: a