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CHEMISTRY – 1997

1. The hybridization state of C atom in butendioic acid is :
   (1) sp²       (2) sp³       (3) both two   (4) sp

2. Which of the following is not a isomer of pentane :
   (1) n-pentane
   (2) 2, 2-dimethy 1 propane
   (3) 2, 3-dimethy 1 butane
   (4) 2-methy 1 butane

3. The oxidation number of C atom in CH₂Cl₂ and CCl₄ are respectively :
   (1) -2 and – 4       (2) 0 and – 4   (3) 0 and 4     (4) 2 and 4

4. Which of the following dissolves in ionic solvents :
   (1) C₆H₅      (2) CH₃OH     (3) CCl₄     (4) C₅H₁₂

5. The conjugate acid of HS is :
   (1) S⁻²       (2) H₂S₂     (3) both two   (4) none

6. Phenolphthalein of pH range [8-10] is used in which of the following type of titration as a suitable indicator :
   (1) NH₄OH and HCl
   (2) NH₄OH and HCOOH
   (3) NH₄OH and C₂H₄O₂
   (4) NaOH and C₂O₄H₂

7. Which of the following is iron are :
   (1) Malachite   (2) Hernatite  (3) Siderite   (4) Limonite

8. The molar concentration of chloride ions in the resulting solution of 300 ml of 3.0 M NaCl and 200 ml of 4.0 M BaCl₂ will be :
   (1) 1.7 M     (2) 1.8 M    (3) 5.0 M    (4) 3.5 M

9. Which of the following has least bond energy :
   (1) N₂⁻²      (2) N₂⁻     (3) N₂⁺    (4) N₂

10. Which of the following species has highest bond energy :
    (1) O₂⁻²     (2) O₂⁺     (3) O₂⁻     (4) O₂

11. Which of the following compound is not aromatic :
    (1) 1, 3-cyclobutene
    (2) pyridine
    (3) furane
    (4) thiophene
12. Which of the following compound is used as refrigerant:
   (1) CCl₂F₂
   (2) CCl₄
   (3) CF₄
   (4) Acetone

13. Which of the following is weak acid:
   (1) C₆H₆
   (2) CH₃-C≡CH
   (3) CH₂=CH₂
   (4) CH₃-C≡C-CH₃

14. L.P.G. mainly consist of the following:
   (1) Methane
   (2) Hydrogen
   (3) Acetylene
   (4) Butane

15. The solubility product of CaCO₃ is 5 x 10⁻⁹. The solubility will be:
   (1) 2.5 x 10⁻⁵
   (2) 7 x 10⁻⁵
   (3) 2.5 x 10⁻⁴
   (4) 2.2 x 10⁻⁹

16. The outer electronic configuration of alkali earth metals is:
   (1) nd¹⁰
   (2) ns¹
   (3) np⁶
   (4) ns²

17. The nature of 2, 4, 6-trinitrophenol is:
   (1) Neutral
   (2) Basic
   (3) Acidic
   (4) Weak basic

18. Which of the following group is sharp ortho and para directive:
   (1) –C₆H₅
   (2) –OH
   (3) –CH₃
   (4) –Cl

19. By which of the following process hydrocarbons are found from petroleum:
   (1) combustion
   (2) fractional distillation
   (3) addition
   (4) all above

20. A sample of petroleum contains 30% n-heptane, 10% 2-methyl hexane and 60% 2, 2, 4-trimethyl pentane, the octane no. of this sample will be:
   (1) 30%
   (2) 60%
   (3) 10%
   (4) 70%

21. In which of the following halogens p-electrons does not take part in resonance:
   (1) CH₂=CH-CH₂Cl
   (2) BrC₆H₅
   (3) C₆H₅Cl
   (4) CH₂=CHCl

22. Which of the following statement is false:
   (1) 40% solution HCHO is known as formalin
   (2) HCHO is least reactive in its homologous series
   (3) The B.P. of isovarelaldehyde is less than n-varelaldehyde
   (4) The boiling point of ketones are higher than that of aldehydes

23. If n + t = 8 then the expected no. of orbitals will be:
   (1) 4
   (2) 9
   (3) 16
   (4) 25
24. \[ \text{Alc. KOH} \rightarrow 2\text{Cl}_2 \rightarrow \text{Ca(OH)}_2 \text{ here the compound C will be :} \]
   (1) Lewsite  (2) Westron  (3) Acetylene tetra chloride  (4) Both 2 and 3

25. Which of the following is least hydrolysed :
   (1) BeCl₂  (2) MgCl₂  (3) CaCl₂  (3) BaCl₂

26. The laughing gas is :
   (1) N₂O₄  (2) NO  (3) N₂O  (4) N₂O₅

27. The hydrogen ion concentration of a solution is 3.98 x 10⁻⁶ mole per liter. The pH value of this solution will be :
   (1) 6.0  (2) 5.8  (3) 5.4  (4) 5.9

28. The reaction of sodium acetate and sodalime gives :
   (1) Butane  (2) Ethane  (3) Methane  (4) Propane

29. Which of the following acids does not contain – COOH group :
   (1) Carbamic acid  (2) Barbituric acid
   (3) Lactic acid  (4) succinnic acid

30. Which of the following compound of xenone does not exists :
   (1) XeF₆  (2) XeF₄  (4) XeF₅  (4) XeF₂

31. FeSO₄, 7H₂O is :
   (1) Mohr’s salt  (2) Blue vitriol  (3) Green vitriol  (4) White vitriol

32. The solution of BiCl₃ in dil. HCI when diluted with water white precipitate is formed which is :
   (1) Bismith oxychloride  (2) Bismith oxide
   (3) Bismith hydroxide  (3) none of these

33. The strongest acid is :
   (1) acetic acid  
   (2) trichloroacetic acid  
   (3) dichloracetic acid  
   (4) monochloroacetic acid

34. The false statement regarding alkane is :
   (1) This does not perform polymerization reaction  
   (2) This does not gives elimination reaction  
   (3) It does not disappear the colour of dilute KMnO₄ solution  
   (4) It does not decolourise bromine water

35. Which of the following is strongest base :
   (1) C₆H₅NH₂  (2) CH₃NH₂
36. Which of the following aromatic compound gives sulphonation reaction very easily:
   (1) Chlorobenzene  (2) Nitrobenzene  (3) Toluene  (4) benzene

37. The geometry of I3- is:
   (1) Triangular  (2) Linear  (3) Tetrahedral  (4) T-shape

38. The half life of a radio active element is 140 days. 1 gm. of this element after 560 days will become:
   (1) \frac{1}{16} gm  (2) \frac{1}{4} gm  (3) \frac{1}{8} gm  (4) \frac{1}{2} gm

39. The volume concentration of hydrogen peroxide 6.8% concentration will be:
   (1) 5  (2) 11.2  (3) 22.4  (4) 20

40. Which of the following on combustion give maximum energy:
   (1) Ethane  (2) Propane  (3) Methane  (4) Butane

41. C6H6 + CH3Cl \rightarrow C6H5CH3 + HCl The name of above reaction is:
   (1) Gattermann  (2) Reimer-tiemann  (3) Friedel-Craft  (4) Cannizaro

42. The oxidation state of Cr in K2Cr2O7 is:
   (1) + 4  (2) + 3  (3) + 6  (4) + 5

43. The natural rubber is the polymer of:
   (1) 1, 3- butadiene  (2) polyamide  (3) isoprene  (4) none of these

44. Nylone-66 is:
   (1) polyester  (2) polyamide  (3) polyacrylate  (4) none of these

45. 2NO(g) + Cl2 (g) \rightleftharpoons 2 NOCl The equilibrium constant for this reaction is:
   (1) \frac{[NOCl]^2}{[NO]^2[Cl2]}  (2) \frac{[NOCl]^2}{[2NO]^2[Cl2]}
   (3) \frac{[NOCl]^2}{[NO]^2[Cl2]}  (4) \frac{[2NOCl]}{[2NO][Cl]}

46. C6H6 + CO + HCl \rightarrow C6H5CHO + HCl here A is:
   (1) anhydrans ZnO  (2) V₂O₅/450⁰ C  
   (3) anhydrous Al₂O₃  (4) solid KOH
47. The values of $K_a$ for HCN and CH₃COOH are $7.2 \times 10^{-10}$ and $1.75 \times 10^{-5}$ (at 25°C) respectively. The strongest acid amongst them is:
(1) CH₃COOH (2) HCN (3) both (4) none of these

48. In which of the following carbon atom (asterisk) is asymmetric:
(1) CH₃CH₂CH(CH₃)CH₂OH
(2) CH₃CH₂CH(CH₃)CHOH
(3) CH₃CH₂CH₂CH₂CH₂OH
(4) CH₃CH₂CH(CH₃)CH₂OH

49. Benzene reacts with CH₃COCl in presence of Lewis acid AlCl₃ to form:
(1) Acetophenone (2) Toluene (3) Benzyl Chloride (4) Chlorobenzene

50. Which of the following is a reducing agent:
(1) H₂S (2) HNO₃ (3) H₂O (4) K₂Cr₂O₇

51. In which of the following alkyl chloride the possibility of SN₁ reaction mechanism is maximum:
(1) (CH₃)₂CHCl (2) (CH₃)₃C-Cl (3) CH₃Cl (4) CH₃CH₂Cl

52. The energy produced related to mass decay of 0.02 amu is:
(1) 28.2 MeV (2) 931 MeV (3) 18.62 MeV (4) none of these

53. The mole of hydrogen ion in 50 ml. of 0.1 M HCl solution will be:
(1) $5 \times 10^{-2}$ (2) $5 \times 10^{-3}$ (3) $5 \times 10^{3}$ (4) $5 \times 10^{-2}$

54. Petroleum is mainly consist of:
(1) Aliphatic alcohol (2) Aromatic hydrocarbon (3) Aliphatic hydrocarbon (4) None of these

55. \[ \Delta \]
C₆H₆OCH₃ + HI \[ \longrightarrow \] ........ + ........... The products in the above reaction will be:
(1) C₆H₅I+CH₃OH (2) C₆H₅CH₃+HOI (3) C₆H₅OH+CH₃I (4) C₆H₆+CH₃OI

56. F₃ is:
(1) Bronsted base (2) Lewis base (3) Lewis acid (4) Bronsted acid

57. Which of the following compound gives violet colour with FeCl₃ solution:
(1) Benzaldehyde (2) Aniline (3) Nitrobenzene (4) Phenol

58. Hypo solution forms which of the following complex compound with AgCl:
(1) Na₅[Ag(S₂O₃)₃] (2) Na₃[Ag(S₂O₃)₂]
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(3) $\text{Na}_2[\text{Ag(S}_2\text{O}_3\text{)}_2]$  (4) $\text{Na}_3[\text{Ag(S}_2\text{O}_3\text{)}_3]$

59. Molecular oxygen is :
(1) ferro magnetic  (2) diamagnetic  (3) para magnetic  (4) non magnetic

60. Bonds in acetylene are :
(1) $2\pi$ bonds  (2) one $\pi$ bond  (3) $3\pi$ bonds  (4) none of these

61. The false statement for Griynaed reagent is :
(1) It gives tertiary alcohol with acetamide
(2) It gives tertiary alcohol with acetone
(3) It gives secondary alcohol with acetaldehyde
(4) It gives primary alcohol with formaldehyde

62. Which of the following alkane exists is liquid state at normal temperature :
(1) $\text{C}_{20}\text{H}_{42}$  (2) $\text{C}_3\text{H}_8$  (3) $\text{C}_8\text{H}_{18}$  (4) $\text{CH}_4$

63. The solubility of AgCl at $25^\circ\text{C}$ will be maximum in :
(1) Potassium chloride solution
(2) $\text{AgNO}_3$ solution
(3) Water
(4) All above

64. The weight of a benzene molecule is :
(1) 78 gm.  (2) 7.8 gm.  (3) $13 \times 10^{-23}$  (4) none of these

65. CuFeS$_2$ is :
(1) iron pyrites  (2) malachite  (3) chalcosite  (4) chalcopyrites

66. Primary halides follow the following reaction mechanism :
(1) SN$_1$  (2) SN$_2$  (3) both  (4) none of these

67. C and Si belong to the same group of periodic table, CO$_2$ is a gas and SiO$_2$ is a :
(1) liquid  (2) gas  (3) solid  (4) none of these

68. H$_2$S is a gas while H$_2$O is a liquid because :
(1) there is association due to hydrogen bonding
(2) bond energy of OH high
(3) the ionization potential of oxygen is high
(4) the electro negativity of oxygen is high

69. “The negative part of the molecule adding to the double bond goes to that unsaturated asymmetric carbon atom which is linked to the least number of hydrogen atoms.” This statement is related to :
(1) Markownikoff’s law
(2) Peroxide effect
(3) Bayer’s law of distortion

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70. The conjugate base of NH₃ is:
(1) N₂H₄   (2) NH₂⁻   (3) NH₄⁺   (4) NH₂⁺

71. (a) N₂ and (b) C₂H₂. The nos. of π and σ bond in the molecules are respectively:
(1) (a) 2,2 (b) 2,2   (2) (a) 1,2 (b) 2,1
(3) (a) 2,1 (b) 2,3   (4) (a) 2,1 (b) 2,1

72. In which of the following compound there are maximum no. of sp² hybrid C atoms:
(1) Benzene   (2) 1,3,5-hexatriene
(2) 1,2,4-hexatriene   (4) both 1 and 2

73. The shape of the molecule having hybrid orbitals of 20% character will be:
(1) octahedral   (2) tetrahedral
(3) square planer   (4) triangular bipyramidal

74. The pH of a solution is 5. If the dilution of this solution is increased by 100 times, the pH value will be:
(1) 5   (2) 7   (3) 9   (4) 8

75. The required amount of oxygen for combustion of 20 ml. of gaseous hydrocarbon is 50 ml. The hydrocarbon will be:
(1) C₂H₂   (2) C₂H₄   (3) C₂H₆   (4) C₃H₄

76. The formula of Celestine is:
(1) SrSO₄   (2) SrCO₃   (3) SrO   (4) SrCl₂

77. CuCl₂ + → Cu + Cl₂. The required amount of electricity for this reaction is:
(1) 4 faraday   (2) 2 faraday   (3) 1 faraday   (4) 3 faraday

78. Nitrogen does not forms NF₅ because:
(1) The bondenergy of N≡N is very high
(2) Vaccent d-orbitals are not present
(3) N belongs to V group
(4) There is inert effect

79. The normal temperature when raised by 10⁰ C, the rate of reaction will be:
(1) lowered by 2 times
(2) increased by 2 times
(3) lowered by 10 times
(4) increased by 10 times

80. Which of the following gives red precipitate with ammonical cuprous chloride:
(1) Propane   (2) Ethane   (3) Methane   (4) Acetylene
81. \([\text{Cu(NH}_3\text{)}_4\text{]}^{2+}\) shows the following hybridization:
(1) dsp²  (2) sp³d  (3) dsp³  (4) sp³

82. A solution contains Cl⁻, I⁻ and S O₄³⁻ ions in it. Which of the following ion is capable to precipitate all of above when added in this solution:
(1) Pb²⁺  (2) Ba²⁺  (3) Hg²⁺  (4) Cu²⁺

83. Fool’s gold is:
(1) Cu₂S  (2) FeS₂  (3) Al₂O₅  (4) CuFeS₂

84. In which of the following compound the central atom is in sp² hybrid state:
(1) OF₂  (2) HgCl₂  (3) XeF₂  (4) NH₂⁺

85. The number of alkenyl groups possible from C₄H₇⁻ are:
(1) 7  (2) 5  (3) 3  (4) 8

86. The tetraethyl lead mixed in petrol is works as:
(1) Cooling agent  (2) Anti knocking agent  (3) Bleaching agent  (4) None of these

87. The alkaline hydrolysis of ester is known as:
(1) dehydrogenation  (2) dehydration  (3) esterification  (4) saponification

88. The degree of ionization of 0.4 M acetic acid will be: \((K_a = 1.8 \times 10^{-5})\)
(1) 6.71 \times 10^{-3}  (2) 1.6 \times 10^{-3}  (3) 0.4 \times 1.8 \times 10^{-5}  (4) 1.8 \times 10^{-5}

89. Haber process is used for production of which of the following:
(1) NH₃  (2) HNO₃  (3) H₂SO₄  (4) O₃

90. The pK_a value of phenolphthalein is 9.1 and the pH range is 8-10. In which of the following titrations it can be used as an indicator:
(1) NH₄OH and HCl  (2) NH₄OH and CH₃COOH  (3) NaOH and HCl  (4) NH₄OH

91. Number of electrons in a one molecule of CO₂:
(1) Pb²⁺  (2) Hg²⁺  (3) Ba²⁺  (4) Cu²⁺

92. Which of the following species shows the maximum magnetic moment:
(1) Mn⁺⁶  (2) Ni²⁺  (3) Fe³⁺  (4) Ag⁺

93. K_sp value of CaF₂ is 3.75 \times 10^{11} The solubility will be:
(1) $1.45 \times 10^{-11}$ mol/litre$^{-1}$
(2) $3.45 \times 10^{-4}$ mol/liter$^{-1}$
(3) $2.05 \times 10^{-4}$ mol/liter$^{-1}$
(4) $3.75 \times 10^{-11}$ mol/liter$^{-1}$

94. When Pb$_3$O$_4$ is heated with dilute HNO$_3$ it gives:
   (1) PbO$_2$ and Pb(NO$_3$)$_2$
   (2) PbO and Pb(NO$_3$)$_2$
   (3) PbO$_2$
   (4) PbO

95. C-H bond length is least in:
   (1) Acetylene  (2) Methane  (3) Ethylene  (4) Ethane

96. The minimum nos. of carbon atoms in ketones which will show chain
   isomerism will be:
   (1) Seven  (2) four  (3) six  (4) five

97. Which of the following organic compound could not be dried by anhydrous
   CaCl$_2$:
   (1) ethanol  (2) benzene  (3) chloroform  (4) ethyl acetate

98. Which of the following compound forms white precipitate with bromine
   water:
   (1) Nitrobenzene  (2) Phenol  (3) Benzene  (4) all above

99. Gypsum is:
   (1) CaSO$_4$.H$_2$O  (2) CaSO$_4$.2H$_2$O
   (3) 2CaSO$_4$.2H$_2$O  (4) CaSO$_4$

100. Which of the following carbonium ion is most stable:
     +                        +
     (1) CH$_3$-C—CH$_3$  (2) CH$_3$CH$_2$

     CH$_3$
     +                        +
     (3) CH$_3$0CH-CH$_3$  (4) CH$_3$
### ANSWER SHEET

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