

PGT Chemistry

1. Two electrons occupying the same orbital are distinguished by:-
 - a. Azimuthal quantum number
 - b. Principle quantum number
 - c. Spin quantum number
 - d. Magnetic quantum number

2. A certain radio station broadcasts at a frequency of 900 kHz. The wavelength of the electromagnetic radiation broadcast by the radio station is:-
 - a. 2.7 km
 - b. 330 m
 - c. 900 m
 - d. 270 m

3. Presence of three unpaired electrons in phosphorus atom can be explained by:-
 - a. Uncertainty principle
 - b. Aufbau's rule
 - c. Hund's rule
 - d. Pauli's rule

4. The maximum no. of electron in a subshell is given by the expression:-
 - a. $4l - 2$
 - b. $4l + 2$
 - c. $2l + 1$
 - d. $2n^2$

5. Which of the following ions has the highest value of ionic radius?
 - a. B^{3+}
 - b. O^{2-}
 - c. Li^+
 - d. F^-

6. The electronic configuration $1s^2 2s^2 2p^6 3s^2 3p^6 3d^9$ represents a:-
 - a. Non metal atom
 - b. Metal atom

- c. Metallic cation
- d. Non metallic anion

7. The species isoelectronic with CN^- ion is:-

- a. Si
- b. O_2
- c. F_2
- d. O^{2-}

8. Which of following has trigonal planar geometry?

- a. NH_3
- b. BF_3
- c. PCl_5
- d. IF_3

9. The number and type of bonds between two carbon atoms in CaC_2 are:-

- $1\frac{1}{2}\pi$
- a. One σ
 - b. Two σ one π
 - c. One σ two π
 - d. One σ one π

10. Among the following, the molecule with highest dipole movement is:-

- a. CHCl_3
- b. CH_2Cl_2
- c. CH_3Cl
- d. CCl_4

11. A sample of water contains X% of D_2O . Its molecular weight is 19. The value of X is:-

- a. 33.33
- b. 25
- c. 50
- d. 75

12. A gaseous mixture contains 50% He, 50% CH_4 by volume. What is the percent by weight of CH_4 in the mixture?

- a. 80.03%

- b. 50%
- c. 20.05%
- d. 19.97%

13. 2N HCl solution will have same molar concentration as a:-

- a. 4.0 N H_2SO_4
- b. 0.5 N H_2SO_4
- c. 1 N H_2SO_4
- d. 2 N H_2SO_4

14. Equal weights of ethane and hydrogen are mixed in an empty container at 25°C. Two fractions of the ideal pressure exerted by hydrogen is:-

- a. 1:16
- b. 1:2
- c. 1:1
- d. 15:16

15. A cylinder of V litre capacity containing NH_3 gas is inverted over another vessel of V litre capacity containing HCl gas at same temp and pressure. After some time the pressure in cylinder will:-

- a. Drop considerably
- b. Remain same
- c. Become $\frac{3}{2}$ of original pressure
- d. Become double

16. The rate of diffusion of methane at a given temp is twice that of a gas X. The molecular weight of X is:-

- a. 40
- b. 64.0
- c. 0.1
- d. 80

17. Enthalpy of a reaction is given as:-

- a. $\Delta H = \Delta U - p\Delta V$
- b. $H = U + pV$
- c. $H = U - pV$
- d. $\Delta H = \Delta U + p\Delta V$

18. How much energy is released when 6 moles of octane is burnt in air?

Given ΔH_f° for $\text{CO}_2(\text{g})$, $\text{H}_2\text{O}(\text{g})$ and $\text{C}_8\text{H}_{18}(\text{g})$ are respectively -490, -240 and +160 kJ/mol.

- a. -37.4 kJ
- b. -20.0 kJ
- c. -35.5 kJ
- d. -6.2 kJ

19. The pH of 0.05 M solution of a strong dibasic acid is:-

- a. 0.2
- b. 0.0
- c. 0.5
- d. 0.1

20. For a reversible reaction, if the concentration of the reactants are doubled, the equilibrium constant will be:-

- a. One-fourth
- b. The same
- c. Doubled
- d. Halved

21. K_{sp} of a substance XY is $10^{-2} \text{ mol}^2 \text{L}^{-2}$, Molecular mass of the substance is 100. Its solubility would be:-

- a. 100 gL^{-1}
- b. 1 gL^{-1}
- c. 10 gL^{-1}
- d. 10^{-1} gL^{-1}

22. Which of the following will occur if a 0.1M solution of a weak acid is diluted to 0.01 M at constant temperature?

- a. $[\text{H}^+]$ will decrease to 0.01M
- b. pH will decrease
- c. Percentage ionization will increase
- d. K_a will increase

23. The oxidation number of copper in CuC_2O_4 is:-

- a. +1
- b. +3

- c. +2
- d. $\frac{8}{3}$

24. The standard electrode potential at a particular temperature:-

- a. Decreases with the increase in concentration
- b. Increases with the increase in concentration of ions
- c. Is constant
- d. None of statement is correct

25. The compound which gives H_2O_2 on treatment with dilute acid is:-

- a. TiO_2
- b. BaO_2
- c. KO_2
- d. MnO_2

26. Polyphosphates are used as water softening agents because they:-

- a. Form soluble complexes with cationic species
- b. Precipitate cationic species
- c. Precipitate anionic species
- d. Form soluble complexes with anionic species

27. Beryllium shows diagonal relationship with:-

- a. Na
- b. Mg
- c. Al
- d. B

28. Which of the following alkali metals has the least melting point?

- a. Na
- b. Rb
- c. Cs
- d. K

29. A sodium salt of unknown anion when treated with MgCl_2 gives white precipitate only on boiling. The anion is:-

- a. NO_3^-
- b. HCO_3^{--}
- c. CO_3^{--2}

d. SO_4^{-2}

30. Boron trichloride on reaction with water produces X along with HCl. X is:-

- a. BOCl_3
- b. H_3BO_3
- c. B_2H_6
- d. B_2O_3

31. The number of OH units directly linked to Boron atoms in $\text{Na}_2\text{B}_4\text{O}_7 \cdot 10\text{H}_2\text{O}$ is:-

- a. 4
- b. 2
- c. 10
- d. 3

32. Aqua regia is a mixture of:-

- a. Conc HNO_3 & Conc H_2SO_4
- b. Conc HCl and Conc HNO_3 in the ratio 3:1
- c. Conc HCl and Conc H_2SO_4 in the ratio 3:1
- d. None of the above

33. Paramagnetism is a property of:-

- a. Completely filled electronic sub-shell
- b. M.pt and b.pt of elements
- c. Non-transitional elements
- d. Unpaired electrons

34. The most common oxidation state of lanthanides is:-

- a. +3
- b. +2
- c. +4
- d. +6

35. In acidic medium, one mole of MnO_4^- accepts how many moles of electrons in a redox process?

- a. 6
- b. 1
- c. 5
- d. 3

36. In an octahedral structure, the pair of d-orbitals involved in d^2sp^3 hybridisation is:-

- a. dx^2-y^2, dz^2
- b. dz^2, dxz
- c. dxy, dyz
- d. dxy, dx^2-y^2

37. Which is not true of the co-ordination compound $[\text{Co}(\text{en})_2\text{Cl}_2] \text{Cl}$?

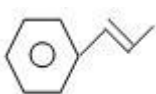
- a. Exhibits optical isomerism
- b. Exhibits geometrical isomerism
- c. Is a cationic complex
- d. Exhibits ionisation isomerism

38. The oxidation state of Fe in brown ring complex $[\text{Fe}(\text{H}_2\text{O})_5\text{NO}]\text{SO}_4$ is:-

- a. +2
- b. +4
- c. +1
- d. +3

39. Which of the following is π -acid ligand?

- a. Ethylenediamine
- b. F^-
- c. NH_3
- d. CO



40. How many bonds are there in .

- a. $14\sigma, 8\pi$
- b. $9\sigma, 4\pi$
- c. $18\sigma, 8\pi$
- d. $14\sigma, 2\pi$

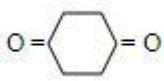
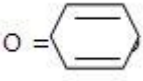
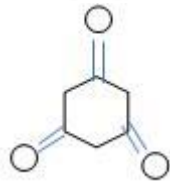
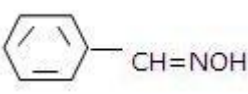
41. An organic compound which produces a bluish green coloured flame on heating in presence of copper is:-

- a. Benzoic acid
- b. Benzaldehyde
- c. Aniline
- d. Chlorobenzene

42. Inductive effect involves:-

- a. Delocalization of σ electrons
- b. Delocalization of π electrons
- c. Displacement of σ electrons
- d. Displacement of π electrons

43. Tautomerism is not exhibited by:-

- a. 
- b. 
- c. 
- d. 

44. $X \xrightarrow{KOH (alc)} Y \xrightarrow{NaNH_2} HC \equiv CNa$

The compound X in the above sequence may be:-

- a. Ethyl alcohol
- b. Chloroform
- c. 1, 2-Dibromoethane
- d. Ethyl bromide

45. The most stable conformation of n-butane is:-

- a. Eclipsed
- b. Full eclipsed
- c. Anti
- d. Gauche

46. The state of hybridization of asterisked carbon in $CH_3CH=C^*=CH_2$ is:-

- a. sp
- b. sp^2

- c. sp^3
- d. None of the above

47. Which of the following reactions will yield 2, 2-dibromopropane?

- a. $CH_3C\equiv CH + 2HBr$
- b. $HC\equiv CH + 2HBr$
- c. $CH_3CH=CH_2 + HBr$
- d. $CH_3CH=CHBr + HBr$

48. Which of the following has the most acidic hydrogen?

- a. Propyne
- b. 2-Butyne
- c. 1-Butyne
- d. Ethyne

49. A smog is essentially caused by the presence of:-

- a. O_2 & O_3
- b. O_3 & N_2
- c. Oxides of S & N
- d. O_2 & N_2

50. Ozone in the stratosphere is depleted by:-

- a. C_6F_{16}
- b. $C_6H_6Cl_6$
- c. CF_2Cl_2
- d. C_6F_6

51. Radius of an octahedral void relative to the radius of the sphere in a close packing is:-

- a. 0.225
- b. 0.414
- c. 1.414
- d. 1.225

52. The percentage of the available space occupied in a hexagonal close packing of sphere in three dimension is:-

- a. 26%
- b. 76%
- c. 74%

d. 52.4%

53. Which of the following is a colligative property?

- a. Osmotic pressure
- b. Electrical conductivity
- c. Boiling point
- d. Vapour pressure

54. Which of the following salts will have same value of Vant Hoff's factor(i) as that of $K_4[Fe(CN)_6]$?

- a. NaCl
- b. $Al_2(SO_4)_3$
- c. Na_2SO_4
- d. $Al(NO_3)_3$

55. 120g of urea is present in 5L of solution, the active mass of urea is:-

- a. 0.4
- b. 0.06
- c. 0.8
- d. 0.2

56. A dilute aqueous solution of Na_2SO_4 is electrolysed using platinum electrodes. The products at the anode and cathode are:-

- a. O_2 , Na_6
- b. $S_2O_8^{2-}$, H_2
- c. $S_2O_8^{2-}$, Na
- d. O_2 , H_2

57. The electrode $Pt, H_2(g)/HCl$ is reversible with respect to:-

- a. Cl^- ions
- b. HCl
- c. H^+ ions
- d. Both H^+ and Cl^- ions

58. The molar conductivity of an electrolyte increases as:-

- a. Dilution decreases
- b. Dilution increases
- c. Temperature decreases

- d. None of the above is correct

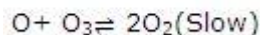
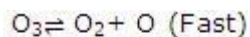
59. A first order reaction has a half-life period of 34.65 seconds. Its rate constant is:-

- a. $2 \times 10^2 \text{ S}^{-1}$
- b. $4 \times 10^{-2} \text{ S}^{-1}$
- c. 20 S^{-1}
- d. $2 \times 10^{-2} \text{ S}^{-1}$

60. If 60% of a first order reaction was completed in 60 minutes, 50% of the same reaction would be completed in approximately ($\log 4 = 0.06$, $\log 5 = 0.69$).

- a. 60 minute
- b. 40 minute
- c. 45 minute
- d. 50 minute

61. The mechanism of $2\text{O}_3 \rightarrow 3\text{O}_2$ is given as



Which of the following represents the rate law?

- a. $r = K [\text{O}_3]^2 [\text{O}_2]^{-1}$
- b. $r = K [\text{O}_3][\text{O}_2]$
- c. $r = K [\text{O}_3]^2$
- d. Unpredictable

62. For a chemical reaction, $x + 2y \rightarrow z$, if the rate of appearance of z is 0.05 moles per litre per hour, then the rate of disappearance of y is:-

- a. $1.0 \text{ mol L}^{-1} \text{ hr}^{-1}$
- b. $0.5 \text{ mol L}^{-1} \text{ hr}^{-1}$
- c. $0.25 \text{ mol L}^{-1} \text{ hr}^{-1}$
- d. Cannot be predicted

63. The nature of bonding forces in adsorption are:-

- a. Purely physical such as Van der Waal forces
- b. Purely chemical
- c. Both chemical & physical
- d. Sometimes physical & sometimes chemical

64. Which of the following is lyophilic colloid?

- a. Milk
- b. Gum
- c. Blood
- d. Fog

65. Which one of the following ores is best concentrated by froth floatation method?

- a. Galena
- b. Malachite
- c. Magnetite
- d. Cassiterite

66. Extraction of zinc from zinc blende is achieved by:-

- a. Roasting followed by reduction with another metal
- b. Roasting followed by self reduction
- c. Roasting followed by reduction with carbon
- d. Electrolytic reduction

67. In which of the following minerals, aluminium is not present?

- a. Mica
- b. Fluorspar
- c. Feldspar
- d. Cryolite

68.
$$X \xrightarrow[\text{(ii) } AgNO_3(aq)]{\text{(i) } KOH(aq)}$$
 white ppt. In this reaction X can be:-

- a. Ethanol
- b. Vinyl Chloride
- c. Chlorobenzene
- d. Iso-Propylchloride

69. S_N1 reaction of alkyl halide leads to:-

- a. Racemisation
- b. Retention of configuration
- c. Inversion of configuration
- d. None of the above

70. In Friedal-Craft synthesis of toluene, reactants in addition to anhydrous AlCl_3 are:-

- a. $\text{C}_6\text{H}_5\text{Cl} + \text{CH}_4$
- b. $\text{C}_6\text{H}_5\text{Cl} + \text{CH}_3\text{Cl}$
- c. $\text{C}_6\text{H}_6 + \text{CH}_3\text{Cl}$
- d. $\text{C}_6\text{H}_6 + \text{CH}_4$

71. Which of the following has the highest nucleophilicity?

- a. NH_2^-
- b. OH^-
- c. F^-
- d. CH_3^-

72. $\text{C}_6\text{H}_5\text{Cl} \xrightarrow[623\text{ K}, 300\text{ atm}]{\text{NaOH(aq)}} \text{A}$, Here, A is:-

- a. Sodium phenoxide
- b. Cyclohexyl chloride
- c. Phenol
- d. Benzene

73. Which of the following is most acidic?

- a. Phenol
- b. o-Cresol
- c. p-Nitrophenol
- d. None of the above

74. Which one of the following compounds will be most readily attacked by an electrophile?

- a. Chlorobenzene
- b. Phenol
- c. Benzene
- d. Toluene

75. In the sequence of reaction, $\text{C}_6\text{H}_5\text{MgBr} \xrightarrow{(\text{CH}_2)_2\text{O}} \text{A} \xrightarrow{\text{H}_2\text{O}} \text{B}$. The product B in the reaction is:-

- a. Phenol
- b. Benzyl alcohol
- c. 2-phenyl ethanol

- d. Resorcinol

76. Acetaldol is a condensation product of:-

- a. Two molecules of propanone
- b. Ethanal and methanal
- c. Ethanal and propanone
- d. Two molecules of ethanal

77. Benzamide on heating with bromine and caustic alkali gives:-

- a. M-bromobenzaldehyde
- b. Benzene
- c. Methyl amine and benzene
- d. Aniline

78.
$$\text{C}_6\text{H}_5\text{COCH}_3 + \text{H}_2 \xrightarrow[\text{BaSO}_4]{\text{Pd}} \text{C}_6\text{H}_5\text{CHO} + \text{HCl}$$
 is called:-

- a. Sandmeyer reaction
- b. Rosemund reaction
- c. Cannizzaro reaction
- d. HVZ reaction

79. Acetone on heating with Conc H_2SO_4 gives:-

- a. Mesityl oxide
- b. Toluene
- c. Mesitylene
- d. Xylene

80. Benzoic acid may be converted into ethyl benzoate by reaction with:-

- a. Dry $\text{HCl}-\text{C}_2\text{H}_5\text{OH}$
- b. Ethanol
- c. Ethyl chloride
- d. Sodium ethoxide

81. Which of the following cannot couple with benzene diazonium chloride?

- a. Benzyl alcohol
- b. Aniline
- c. Phenol

d. β -naphthol

82.
$$\text{Aniline} \xrightarrow{\text{Br}_2(aq)} X \xrightarrow{\text{NaNO}_2 / \text{HCl}} Y \xrightarrow[\text{(ii) Heat}]{\text{(i) HBF}_4} Z$$
 . In this sequence Z is:-

- a. 2,4,6-Tribromo 1-fluorobenzene
- b. P-bromoaniline
- c. P- bromofluorobenzene
- d. 1,3,5-Tribromobenzene

83. $\text{C}_6\text{H}_5\text{CONHCH}_3$ can be converted into $\text{C}_6\text{H}_5\text{CH}_2\text{NHCH}_3$ by:-

- a. H_2 -Pd
- b. NaBH_4
- c. Zn-Hg/HCl
- d. LiAlH_4

84. Benzamide on reaction with POCl_3 gives:-

- a. Benzyl amine
- b. Chlorobenzene
- c. Aniline
- d. Benzonitrile

85. Vitamin B_{12} contains:-

- a. Zn (II)
- b. Co (III)
- c. Ca (II)
- d. Fe (II)

86. Complete hydrolysis of cellulose gives:-

- a. D-fructose
- b. L-glucose
- c. D-glucose
- d. D-ribose

87. Polymer used in bullet proof glass is:-

- a. Lexan
- b. Nomex
- c. Kevlar

d. PMMA

88. Which is not a polymer?

- a. Teflon
- b. Enzyme
- c. Starch
- d. Sucrose

89. Which of the following antibiotic contains NO_2 group attached to aromatic nucleon in its structure?

- a. Penicillin
- b. Streptomycin
- c. Chloramphenicol
- d. All of the above

90. Amoxyllin is semisynthetic modification of:-

- a. Penicillin
- b. Streptomycin
- c. Tetracycline
- d. Chloramphenicol

06 Feedback

91. How was the overall experience while giving the test?

- a. Excellent
- b. Very Good
- c. Good
- d. Average