Chemistry

VOLUME - 1

Physical Chemistry

Quantum Success Mantraa: SCQ-NCERT Based

Choose the appropriate answer:

1. The number of significant figures in 0.0075 are
   (1) two (2) three
   (3) four (4) five
2. Energy given, $E_n = -3.4$ ev/atm for H-atom
   (1) 1 (2) 3
   (3) 2 (4) none
3. Which one of cation has maximum spin multiplicity (S.M.)
   (1) Fe^{++} (2) Fe^{+++}
   (3) Ni^{++} (4) Co^{++}
4. Which of the following best explains the law of conservation of mass ?
   (1) No change in mass is observed when 2.0 g of Mg is heated in vacuum
   (2) 1.2 g carbon when burnt in excess of oxygen consumes only 3.2 g of it to form 4.4g of carbon dioxide
   (3) 12 g of carbon when heated in a limited supply of air produces only 20 g of carbon monoxide
   (4) A sample of air on heating does not show any change in mass but volume increases.
5. If specific heat of a certain element is 0.064. Its approximate atomic mass is
   (1) 100 (2) 10
   (3) 20 (4) 200
6. The equivalent mass of H_3PO_4 in the reaction given below is
   $H_3PO_4 + NaOH \rightarrow NaH_2PO_4 + H_2O$
   (1) 49 (2) 98
   (3) 32.6 (4) 40
7. The equivalent mass of $KMnO_4$ (in acid medium) is (At. wt. of K = 39, Mn = 55)
   (1) 158 (2) 15.8
   (3) 31.6 (4) 3.16
8. The mass of 60% pure HCl required for the neutralization of 10 L of 0.1 M KOH is
   (1) 60.8 g (2) 21.9 g
   (3) 100 g (4) 219.g
9. The minimum amount of H_2S required to precipitate 6.35 g of Cu^{2+} ions from the aqueous solution is
   (1) 6.8 g (2) 3.4 g
   (3) 17 g (4) 8.5 g
10. The volume of CO_2 produced at STP by the combustion of 20 g of graphite containing 10% impurity will be
    (1) 33.6 L (2) 22.4 L
    (3) 11.2 L (4) 44.8 L
11. How many molecules of an ideal gas are there in 1 ml of the gas if temperature is 27°C and pressure is 3 atm ?
    (1) 8.15×10^{23} (2) 8.15×10^{20}
    (3) 7.34×10^{19} (4) 7.34×10^{22}
12. The weight of slaked lime necessary to decompose completely 1.07 g of ammonium chloride is
    (1) 0.74 g (2) 1.48 g
    (3) 7.4 g (4) 0.37 g
13. A metallic oxide contains 60% of the metal. The equivalent weight of the metal is
    (1) 12 (2) 24
    (3) 48 (4) 72
14. Minimum volume of SO_2 gas at S.T.P, which reduces 100 mL of 0.2 N $K_2Cr_2O_7$ is
    (1) 11.2 mL (2) 224 mL
    (3) 40 mL (4) 112 mL
15. The number of ions present in 2.0 L of a solution of 0.8 M $K_4[Fe(CN)_6]$ is
    (1) 4.8×10^{22} (2) 4.8×10^{24}
    (3) 9.6×10^{24} (4) 9.6×10^{22}
16. 30 mL of a dibasic acid is neutralized by 15 mL of 0.2 N NaOH. The molarity of the acid is
    (1) 0.05 M (2) 0.2 M
    (3) 0.3 M (4) 0.4 M
17. The density of water at 4°C is 1.0×10^3 kg-m^{-3}. The volume occupied by one molecule of water is approximately
    (1) 3.0×10^{-23} mL (2) 6.0×10^{-22} mL
    (3) 3.0×10^{-21} mL (4) 9.0×10^{-23} mL

18. 11.2 L of a gas at STP weighs 14.0 g. The gas would be
(1) N_2O (2) NO_2
(3) N_2 (4) CO_2

19. How many moles of $MgIn_2S_4$ can be made from 1.00 g of magnesium (of atomic mass = 24.0), 1.00 g of indium (of atomic mass = 114.8) and 1.00 g of sulphur (of atomic mass = 32.0)?
(1) 6.74×10^{-4} (2) 3.1×10^{-2}
(3) 4.17×10^{-2} (4) 8.7×10^{-3}

20. The charge on 1 gram ion of Al^{3+} is
(1) $\frac{1}{27} N_A e$ coulomb (2) $\frac{1}{3} \times N_A e$ coulomb
(3) $\frac{1}{9} N_A e$ coulomb (4) $3 \times N_A e$ coulomb

21. How many moles of HCl will be present in 100 mL of a solution of specific gravity 1.08, containing 20% HCl by mass ?
(1) 0.50 (2) 0.60
(3) 0.80 (4) 0.12

22. The density in grams per litre of a mixture containing an equal number of moles of methane and ethane at STP is
(1) 1.03 (2) 1.10
(3) 0.94 (4) 1.20

23. The number of molecules in 100 mL of 0.02-N H_2SO_4 is
(1) 6.02×10^{20} (2) 6.02×10^{18}
(3) 6.02×10^{21} (4) 6.02×10^{22}

24. Mass of one atom of an element is 6.644×10^{-23} gm. The number of gm-atoms of element in 40 kg of it is
(1) 10^3 g-atom (2) 10^2 g-atom
(3) 10^1 g-atom (4) None of these

25. The Loschmidt number is the number of
(1) molecules present in 1 mL of a gas at S.T.P.
(2) molecules in 1 gram moles of a gas at S.T.P.
(3) atoms present in 1 mL of a gas at S.T.P.
(4) atoms present in 1 gram mole of a gas at S.T.P.

26. Which law of chemical combination is illustrated by the following data? 0.5 gm of lime stone on heating gave 0.28 gm of CaO and 112 ml of CO_2 at STP?
(1) Law of definite proportions
(2) Gay Lussac's law
(3) Law of conservation of mass
(4) Law of multiple proportions

27. The atomic weighs of two elements A and B are 40 and 80 respectively. If x gm of A contains y atoms, how many atoms are present in 2x gm of B?
(1) $\frac{y}{2}$ (2) $\frac{y}{4}$
(3) y (4) 2y

28. A mixture of $C_2H_4(g)$ and $C_3H_8(g)$ was kept in a 0.820-L vessel at 1 atm and 300 K. The weight of the gas mixture in the vessel is 0.613 g. Calculate the ratio of the numbers of moles of $C_3H_8(g)$ and $C_2H_4(g)$.
(1) 1.54 (2) 1.68
(3) 1.44 (4) 1.60

29. When burnt in air, a 12.0-g mixture of carbon and sulphur yields a mixture of CO_2 and SO_2, in which the number of moles of SO_2 is half that of CO_2. The mass of the carbon the mixture contains is
(1) 4.08 g (2) 5.14 g
(3) 8.74 g (4) 1.54 g

30. X and Y are two elements which form X_2Y_3 and X_3Y_4. If 0.20 mol of X_2Y_3 weighs 32.0 g and 0.4 mol of X_3Y_4 weighs 92.8 g, the atomic weights of X and Y are respectively
(1) 16.0 and 56.0 (2) 8.0 and 28.0
(3) 56.0 and 16.0 (4) 28.0 and 8.0

31. The vapour density of a mixture containing NO_2 and N_2O_4 is 38.3 at 300 K. The number of moles of NO_2 in 100 g of the mixture is approximately
(1) 0.44 (2) 4.4
(3) 33.4 (4) 3.34

32. The simplest formulae of a compound containing 50% of the element X (at. wt 10) and 50% of element Y (at wt. 20) is
(1) XY (2) X_2Y
(3) XY_3 (4) X_2Y_3

33. The atomic weight of Cu is 63.546. There are only two naturally occurring isotopes of copper, ^{63}Cu and ^{65}Cu. The natural abundance of the ^{63}Cu isotope is approximately
(1) 20% (2) 73%
(3) 30% (4) 80%

34. 60 g of NaOH is converted into NaCl and $NaClO_3$ by the action of Cl_2. The Cl_2 is produced by the reaction between MnO_2 and concentrated HCl. The amount of MnO_2 required for the process is (Mn = 55, Na = 23)
(1) 70.95 g (2) 25.65 g
(3) 65.25 g (4) 75.45 g

35. 1 g of a mixture of $NaHCO_3$ and Na_2CO_3 is heated to 150°C. The volume of the CO_2 produced at S.T.P. is 112.0 mL. Calculate the percentage of Na_2CO_3 in the mixture (Na = 23, C = 12, O = 16)
(1) 20 (2) 46
(3) 84 (4) 16

36. 20 mL of a gaseous hydrocarbon was exploded with 120 mL of oxygen. A contraction of 60 mL was observed, and a further contraction of 60 mL took place when an alkali was added. What is the formula of the hydrocarbon ?
(1) C_3H_6 (2) C_3H_8
(3) C_2H_6 (4) C_4H_{10}

37. Oxygen content in air is 21% by volume. The volume of air required to combust 78 gm of benzene completely at STP is
(1) 56 litre (2) 800 litre
(3) 22.4 litre (4) None of these

38. The first emission line in the atomic spectrum of hydrogen in the Balmer series appears at
(1) $\frac{9R}{400}cm^{-1}$ (2) $\frac{7R}{144}cm^{-1}$
(3) $\frac{5R}{36}cm^{-1}$ (4) $\frac{3R}{4}cm^{-1}$

39. The mass of a cricket ball is 0.21 kg. If the order of uncertainty in position is 100 pm then uncertainty in its velocity will be
(1) 3.5×10^{-20} m/sec (2) 6.02×10^{23} m/sec
(3) 6.625×10^{-27} m/sec (4) 2.5×10^{-24} m/sec

40. The number of equivalent present in 60 mL of 4.0 N solution is
(1) 0.60 eq (2) 0.40 eq
(3) 0.24 eq (4) 24.00 eq

6. The behaviour of a real gas is usually depicted by plotting compressibility factor Z versus P at a constant temperature. At high temperature and high pressure, Z is usually more than one. This fact can be explained by van der Waal's equation when :
(1) The constnat a is negligible and not b
(2) The constant b is negligible and not a
(3) Both the constant a and b are negligible
(4) Both the constant a and b are not negligible

42. The units of the product PV are same as that of
(1) Entropy (2) Momentum
(3) Force (4) Work or energy

43. A flask filled with gas X was weighted at certain temperature and pressure and has a mass equal to Wg. The flask was then filled with oxygen at the same temperature and pressure and was found to have mass equal to 0.2 W g. The molecular mass of X is
(1) 160 (2) 80
(3) 70 (4) 90

44. A certain elementary gas is triatomic and has vapour density 48. The atomic mass of the gas is
(1) 48 (2) 96
(3) 32 (4) 16

45. A balloon containing methane is pricked with a sharp needle and quickly plunged into a tank of hydrogen at same pressure. After sometime, the balloon will
(1) get enlarged
(2) get collapsed
(3) remain as before
(4) reduce to half of its original size

46. At lower temperature, all gases except H_2 and He show :
(1) Negative deviation
(2) Positive deviation
(3) Positive and negative deviation
(4) none of the above

47. The volume of H_2S gas measured at 1 atm and 0°C produced when 16.6 gm of KI reacts with excess of H_2SO_4 is
(1) 28.00 ml (2) 280 ml
(3) 80.20 ml (4) 20.80 ml

48. At STP, the order of root mean square speed of molecules of H_2, N_2 and HBr is :
(1) $H_2 > N_2 > O_2 > HBr$
(2) $HBr > O_2 > N_2 > H_2$
(3) $HBr > H_2 > O_2 > N_2$
(4) $N_2 > O_2 > H_2 > HBr$

49. For two gases, A and B with molecular weights M_A and M_B, it is observed that at a certain temperature, T, the mean velocity of A is equal to the root mean square velocity of B. Thus, the mean velocity of A can be made equal to the mean velocity of B, if :
(1) A is at temperature, T, and B at T′, T > T′
(2) A is lowered to a temperature $T_2 < T$ while B is at T
(3) Both A and B are raised to a higher temperature
(4) Both A and B are placed at lower temperature

50. The ratio of excluded volume per molecule to the actual volume of the molecule is
(1) 2 : 1 (2) 3 : 1
(3) 4 : 1 (4) 5 : 1

51. The temperature at whcih the second virial coefficient of a real gas is zero is called :
(1) Critical temperature (2) Eutectic point
(3) Boiling point (4) Critical pressure

52. Equivalent weight of a metal is 9 and V.D of its chloride is 66.75, the atomic weight of the metal is
(1) 27 (2) 18
(3) 36 (4) 9

53. Calculate the percentage of NO_2 by weight in N_2O_4 (a dimer of NO_2) which has a vapour density of 36
(1) 27.7 (2) 67.7
(3) 37.7 (4) 25.7

54. At S.T.P., 0.48 g of O_2 diffused through a porous partition in 1200 seconds. What volume of CO_2 will diffuse in the same time and under the same conditions?
(1) 286.5 mL (2) 346.7 mL
(3) 112.2 mL (4) 224.8 mL

55. At what temperature will the molar KE of 0.3 mol of He be the same as that of 0.4 mol of argon at 400 K?
(1) 700 K (2) 533 K
(3) 800 K (4) 400 K

56. The rms speed of N_2 molecules in a gas is u. If the temperature is doubled and the nitrogen molecules dissociate into nitrogen atoms, the rms speed becomes
(1) u/2 (2) 2u
(3) 4u (4) 14 u

57. The compressibility of a gas is less than unity at S.T.P. Therefore
(1) $V_m > 22.4$ L (2) $V_m < 22.4$ L
(3) $V_m = 22.4$ L (4) $V_m = 44.8$ L

58. How many gram atoms of sulphur are present in 100 mL of 0.1 N H_2SO_4 ?
(1) 1.00 (2) 0.50
(3) 0.05 (4) 0.005

59. If two gases H_2 and O_2 have same number of molecules, the ratio between their volume at same temperature and pressure will be
(1) 1:1 (2) 1:2
(3) 2:1 (4) 1:3

60. Consider the following gases and their corresponding values of 'a' are given in brackets.
$CH_4(2.25)$, $N_2(1.35)$, $O_2(1.36)$ and $CO(1.46)$
Which of them will liquefy with great difficulty ?
(1) CH_4 (2) N_2
(3) O_2 (4) CO

61. The density of sea-water is 1.03 g cm^{-3} and that of freshwater is 1.00 g cm^{-3}. The height of a seawater column and the pressure exerted by it can be
(1) 0.10 m and 0.1 atmosphere
(2) 1.0 m and 1 atmosphere
(3) 10.0 m and 1.0 atmosphere
(4) 12.0 m and 2 atmosphere

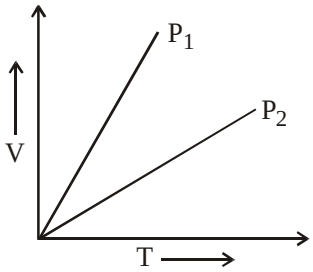
62. Let p and p_s be the partial pressure and saturated partial pressure of water respectively. Then the relative humidity is given by
(1) $\frac{p_s + p}{p_s} \times 100$ (2) $\frac{p}{p_s} \times 100$
(3) $\frac{p_s}{p} \times 100$ (4) $(p + p_s) \times 100$

63. 300 ml of a gas at 27°C is cooled to 7°C at constant pressure, the final volume will be
(1) 540 ml (2) 135 ml
(3) 280 ml (4) 350 ml

64. A volume V of a gas at a temperature T_1 and a pressure p is enclosed in a sphere. It is connected to another sphere of volume V/2 by a tube and stopcock. The second sphere is initially evacuated and the stopcock is closed. If the stopcock is opened the temperature of the gas in the second sphere becomes T_2. The first sphere is maintained at a temperature T_1. What is the final pressure p_1 within the apparatus?
(1) $\frac{2pT_2}{2T_2 + T_1}$ (2) $\frac{2pT_2}{T_2 + 2T_1}$
(3) $\frac{pT_2}{2T_2 + T_1}$ (4) $\frac{2pT_2}{T_1 + T_2}$

65. A bubble of gas released at the bottom of a lake increases to eight times its original volume when it reaches the surface. Assuming that atmospheric pressure is equivalent to the pressure exerted by a column of water 10 m high, what is the depth of the lake ?
(1) 90 m (2) 10m
(3) 70 m (4) 80m

66. V *vs* T curves at different pressures P_1 and P_2 for an ideal gas are shown below



Which one of the following is correct ?

(1) $P_1 > P_2$ (2) $P_1 < P_2$

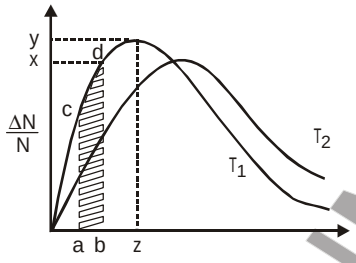
(3) $P_1 = P_2$ (4) $\frac{P_2}{P_1} = \frac{1}{2}$

67. 80 gm of Hydrogen (H_2) is made to react with 80 gm of oxygen (O_2). The mass of water formed will be

(1) 80.00 gm (2) 90.00 gm

(3) 36.00 gm (4) 72.00 gm

68. The point marked as z refer to



(1) root mean square speed at T_1

(2) average speed at T_1

(3) most probable speed at T_1

(4) highest possible speed at T_1

69. A balloon with volume 4200 m^3 is filled with helium gas at 27°C, 1 bar pressure and is found to weigh 700 kg. If density of air is 1.2 kg m^{-3}, the pay load of balloon is

(1) 5040 kg (2) 4340 kg

(3) 3500 kg (4) 5740 kg

70. 10 g of ethane is confined in a bulb of 1 dm^3 capacity which can withstand a maximum pressure of 10 bar. At what temperature will the pressure of gas reach the bursting limit ?

(1) 76°C (2) 361.4° C

(3) 88.4°C (4) 120°C

71. Which of the following gaseous mixture does not follow Dalton's law ?

(1) O_2 and CO_2 (2) Cl_2 and O_2

(3) NH_3 and HCl (4) N_2 and O_2

72. A bottle of dry ammonia and a bottle of dry hydrogen chloride connected through a long tube are opened simultaneously at both ends, the white ammonium chloride ring first formed will be

(1) at the centre of the tube

(2) near the hydrogen chloride bottle

(3) near the ammonia bottle

(4) throughout the length of the tube

73. The internal energy of one mole of ideal gas is:

(1) $\frac{3}{2}RT$ (2) $\frac{1}{2}KT$

(3) $\frac{1}{2}RT$ (4) $\frac{3}{2}KT$

74. What volumes of 6 M HCl and 2 M HCl should be mixed to get one litre of 3M HCl solution?

(1) 0.25 lit. 6 M and 0.75 lit 2M HCl

(2) 200 ml 6M and 800 ml 2M HCl

(3) 0.75 lit. 6 M and 0.25 lit. 2M HCl

(4) 800 ml 6M and 200 ml 2M HCl

75. If the mean path is '*l*' at one atm pressure then its value at 5 atm pressure is

(1) $\frac{l}{5}$ (2) $5l$

(3) $\frac{2}{5}l$ (4) unpredictable

76. 0.03 gm of a metal releases 11.2 ml of H_2 at NTP from a dibasic acid, atomic weight of a metal is

(1) 30 (2) 60

(3) 45 (4) 50

77. At high temperature and low pressure the van der waal's equation is reduced to

(1) $\left(p + \frac{a}{V_m^2}\right)(V_m) = RT$

(2) $pV_m = RT$

(3) $P(Vm - b) = RT$

(4) $\left(p + \frac{a}{V_m^2}\right)(V_m - b) = RT$

78. The molecular weight of a gas have to be if the pressure of the gas is to fall to one-half of its value in vertical distance of 1 metre at the temp. of 25 °C

(1) 175000 (2) 350000

(3) 200 (4) none of these

79. The difference in the density of dry air at 1 atm and 25°C and most air with 50% relative humidity under the same condition will be

(1) 0.007 Kg m^{-3} (2) 0.014 Kg m^{-3}

(3) 0.0035 Kg m^{-3} (4) none of these

80. An open vessel at 27°C is heated until 3/8th of the air in it has been expelled. Assuming that the volume remains constant; calculate the temp. at which the vessel was heated
(1) 307°C (2) 107°C
(3) 480°C (4) 207°C

81. In a face centred cubic lattice the number of nearest neighbours for a given lattice point are :
(1) 6 (2) 8
(3) 12 (4) 14

82. Which of the following is/are pseudo solids?
I. KCl
II. Barium chloride dihydrate
III. Rubber
IV. Solid cake left after distillation of coal tar.
(1) I and III (2) II and III
(3) III and IV (4) III only

83. The total number of crystal systems and the number of Bravais lattices are respectively
(1) 7, 7 (2) 14, 7
(3) 7, 14 (4) 14, 28

84. An element A has face centered cubic structure with edge length equal to 361 pm. The apparent radius of atoms A is
(1) 127.6 pm (2) 180.5 pm
(3) 160.5 pm (4) 64 pm

85. Sodium metal adopts bcc structure, the distance between nearest sodium atoms 368 nm. The edge length of the unit cell is
(1) 0.368 nm (2) 0.184 nm
(3) 0.575nm (4) 0.425 nm

86. The void formed by closed packed array of spheres located at the alternate corners of each face is
(1) Triangular void (2) Octahedral void
(3) Tetrahedral void (4) Cubical void

87. In a body centered cubic unit cell, the number of metal atoms surrounding the metal atom at the centre is
(1) 8 (2) 6
(3) 12 (4) 4

88. The available space occupied by spheres of equal size in three dimensions in both hcp and ccp arrangement is respectively
(1) 74%, 68% (2) 70%, 74%
(3) 60.4%, 52.4% (4) 74%, 74%

89. All spinel structures have a
(1) ccp array of anions
(2) simple cubic structures
(3) bcc array of anions
(4) hexagonal close-packed array of anions

90. An element adopts a cubical crystal structure in which only 68% of the space is occupied. The edge length of unit cell is 288 pm. If density of element is 7.20 g cm^{-3}. The number of atoms present in 104 g of the element is (the volume of unit cell is 2.39×10^{-23} cc)
(1) 1.208×10^{23} (2) 1.208×10^{24}
(3) 1.208×10^{25} (4) 1.208×10^{22}

91. How many unit cells are present in 39.0 g of potassium that crystallizes in body centered cubic structure
(1) N_A (2) $N_A/4$
(3) $0.5\ N_A$ (4) $0.75\ N_A$

92. Bragg reflection can occur only for
(1) $\lambda \leq 2d$
(2) $\lambda \geq 2d$
(3) $\lambda > 2d$
(4) none of these

93. For an ionic crystal of the general formula $A^+ B^-$ and co-ordination number 6, the rdius ratio will be :
(1) Greater than 0.73
(2) Between 0.73 and 0.41
(3) Between 0.41 and 0.22
(4) Less than 0.22

94. When electrons are trapped in the crystal lattice in place of anion vacancy, the defect in the crystal is called
(1) F-centre (2) Dislocation
(3) Electronic defect (4) G-centre

95. Three elements, P, Q and R crystallize in a cubic solid lattice. The P atoms occupy the corners, Q atoms the cube centres and R atoms the edges. The formula of the compound is
(1) PQR (2) PQR_2
(3) PQR_3 (2) PQ_3R

96. NaCl is dropped with 10^{-3} mol% solution of $SrCl_2$. The cation vaccancies per mole are
(1) 6.02×10^{24} (2) 6.02×10^{23}
(3) 6.02×10^{20} (4) 6.02×10^{18}

97. The numbers of tetrahedral and octahedral holes in a ccp array of 100 atoms are respectively
(1) 200 and 100 (2) 100 and 200
(3) 200 and 200 (4) 100 and 100

98. For a reaction $2A + B \rightarrow C + D$ the partial pressure of A,B,C and D at equilibrium are 0.5, 0.8, 0.7 and 1.2 atmosphere respectively. The value of Kp for this reaction is
(1) 2.4 (2) 4.2
(3) 0.42 (4) 0.24

99. In normal spinel structure there is a closed packed array of O^{2-} ions. The trivalent cations are present in
(1) 75% of octahedral voids
(2) 50% of octahedral voids
(3) 12.5% of tetrahedral voids
(4) 25% of octahedral voids

100. Pyrosilicates $(Si_2O_7)^{-6}$ are obtained when
(1) two SiO_4^{4-} tetrahedra share a common oxygen
(2) two oxygen of each SiO_4^{4-} tetrahedron are shared with others
(3) three corners of each of SiO_4^{4-} tetrahedron are shared
(4) when no oxygen is shared with others

101. If we mix pentavalent impurity in a crystal lattice of germanium, the type of semi-conductor formed is
(1) n-type
(2) p-type
(3) both n and p type
(4) none of the two

102. The number of unit cells in 58.5 g of NaCl is nearly
(1) 6×10^{20} (2) 3×10^{22}
(3) 1.5×10^{23} (4) 0.5×10^{24}

103. The pyknometer density of NaCl crystal is 2.165×10^3 kg m^{-3}, while its X-ray density is 2.178×10^3 kg m^{-3}. The fraction of unoccupied sites in sodium chloride crystal is
(1) 5.96×10^{-3} (2) 5.96
(3) 5.96×10^{-2} (4) 5.96×10^{-1}

104. In a face centered cubic arrangement of A and B atoms whose A atoms are at the corner of the unit cell and B atoms at the face centres. One of the A atom is missing from one corner in unit cell. The simplest formula of compound is
(1) A_7B_3 (2) AB_3
(3) A_7B_{24} (4) A_4B

105. Tourmaline crystals is an example of
(1) Piezoelectric crystals
(2) Pyroelectric crystals
(3) Ferroelectric crystals
(4) None

106. 120 gm of an ideal gas of molecular weight 40 are confined to a volume of 20 lit at 400 K. Using R = 0.0821 lit atm k^{-1} mol^{-1}, the pressure of the gas is
(1) 4.92 atm (2) 4.98 atm
(3) 5.02 atm (4) 4.00 atm

107. For a reaction $A + 2B \longrightarrow C$, 5 moles of A and 8 moles of B will produce
(1) 5 mole of C
(2) 4 mole of C
(3) 8 moles of C
(4) 13 moles of C

108. Which arrangement of electrons leads to ferromagnetism?
(1) ↑↑↑↑↑ (2) ↑↓↑↓
(3) ↑↑↑↓↓ (4) none of these

109. Which of the following statement is correct ?
(1) The coordination number of each type of ion in a CsCl crystal is eight.
(2) A metal that crystallizes in a b.c.c. structure has a coordination number of twelve
(3) A unit cell of an ionic crystal shares some of its ions with other unit cells
(4) The length of the unit cell in NaCl is 552 pm (given that r_{Na^+} = 95 pm and r_{Cl^-} = 181 pm

110. Iron crystallizes in a b.c.c. system with a lattice parameter of 2.861 Å. Calculate the density of iron in the b.c.c. system (atomic weight of Fe = 56, $N_A = 6.02 \times 10^{23}$).
(1) 7.92 g mL^{-1}
(2) 8.96 g mL^{-1}
(3) 2.78 g mL^{-1}
(4) 6.72 g mL^{-1}

111. In a compound AxBy
(1) Mole of A = Mole of B = Mole of AxBy
(2) Eq. of A = Eq. of B = Eq. of AxBx
(3) y × Mole of A = y × mole of B = (x+y) × mole of AxBy
(4) y × Mole of A = y × moles of B

112. The energy levels for $_ZA^{)+z-1)}$ can be given by :

(1) E_n for $A^{(+z-1)} = Z^2 \times E_n$ for H

(2) E_n for $A^{(+z-1)} = Z \times E_n$ for H

(3) E_n for $A^{(+z-1)} = \frac{1}{Z^2} \times E_n$ for H

(4) E_n for $A^{(+z-1)} = \frac{1}{Z} \times E_n$ for H

113. Of the following, which of the statement(s) regarding Bohr theory is wrong :

(1) Kinetic energy of an electron is half of the magnitude of its potential energy

(2) Kinetic energy of an electron is negative of total energy of electron

(3) Energy of electron decreases with increase in the value of the principal quantum number

(4) The ionization energy of H-atom in the first excited state is negative of one fourth of the energy of an electron in the ground state.

114. Which statement is correct :

(1) Volume of proton is approximately $(4/3\ \pi r^3)$ 1.5×10^{-38} cm^3

(2) The radius of electron is 42.8×10^{-3} cm

(3) The density of nucleus is 10^{14} g/cm^3

(4) All are correct

115. 0.45g of an acid of mol. wt. 90 was neutralised by 20 ml of 0.5N caustic potash. The basicity of the acid is

(1) 1 (2) 2

(3) 3 (4) 4

116. If E_1, E_2 and E_3 represent respectively the kinetic energies of an electron, an alpha particle and a proton respectively each having same de Broglie wavelength then:

(1) $E_1 > E_3 > E_2$ (2) $E_2 > E_3 > E_1$

(3) $E_1 > E_2 > E_3$ (4) $E_1 = E_2 = E_3$

117. Photoelectric effect is the phenomenon in which:

(1) Photons come out of a metal when it is hit by a beam of electrons

(2) photons come out of the nucleus of an atom under the action of an electric field

(3) Electrons come out of a metal with a constant velocity which depends on the frequency and intensity of incident light wave

(4) Electrons come out of a metal with different velocities not greaterthan a certain value which depends only on the frequency of the incident light wave and not on its intensity

118. Photoelectric emission is observed from a surface for frequencies v_1 and v_2 of the incident radiation ($v_1 > v_2$). If the maximum kinetic energies of the photoelectrons in the two cases are in the ratio 1 : k then the threshold frequency v_0 is given by:

(1) $\frac{v_2 - v_1}{k-1}$ (2) $\frac{kv_1 - v_2}{k-1}$

(3) $\frac{kv_2 - v_1}{k-1}$ (4) $\frac{v_2 - v_1}{k}$

119. The ratio of the difference in energy of electron between the first and second Bohr's orbits to that between second and third Bohr's orbits is:

(1) 1/3 (2) 27/5

(3) 9/4 (4) 4/9

120. If each hydrogen atom is excited by giving 8.4 eV of energy, then the number of spectral lines emitted is equal to

(1) None (2) Two

(3) Three (4) Four

121. Atoms consist of electrons, protons and neutrons. If the mass attributed to neutron were halved and that attributed to the electrons were doubled, the atomic mass of $_6C^{12}$ would be approximately :

(1) Same

(2) Doubled

(3) Halved

(4) Reduced by 25%

122. The orbital cylindrically symmetrical about x-axis is:

(1) p_z (2) p_y

(3) p_x (4) d_{xz}

123. The work function for a metal is 4 eV. To emit a photo-electron of zero velocity from the surface of the metal, the wavelength of incident light should be:

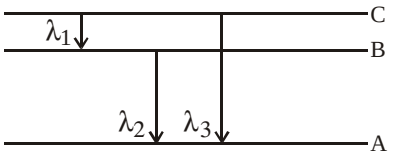
(1) 2700 Å (2) 1700 Å

(3) 5900 Å (4) 3100 Å

124. If the series limit of wavelength of the Lyman series for the hydrogen atoms is 912 Å, then the series limit of wavelength for the Balmer series of the hydrogen atom is:

(1) 912 Å (2) 912 × 2 Å
(3) 912 × 4 Å (4) 912/2 Å

125. Energy levels A, B, C of a certain atom corresponds to increasing value of energy, i.e., $E_A < E_B < E_C$. If λ_1, λ_2 and λ_3 are the wavelengths of radiations corresponding to the transitions C to B, B to A and C to A respectively, which of the following statement is correct :



(1) $\lambda_3 = \lambda_1 + \lambda_2$ (2) $\lambda_3 = \frac{\lambda_1\lambda_2}{\lambda_1 + \lambda_2}$
(3) $\lambda_1 + \lambda_2 + \lambda_3 = 0$ (4) $\lambda_3^2 = \lambda_1^2 + \lambda_2^2 = 0$

126. A photon of 300 nm is absorbed by a gas and then re-emits two photons. One re-emitted photon has wavelength 496 nm, the wavelength of second re-emitted photon is :
(1) 757 nm (2) 857 nm
(3) 957 nm (4) 657 nm

127. The frequency of first line of Balmer series in hydrogen atom is v_0. The frequency of corresponding line emitted by singly ionised helium atom is :
(1) $2v_0$ (2) $\frac{1}{r}$
(3) $\sqrt{r}$ (4) $\frac{1}{\sqrt{r}}$

128. Which of the d-orbitals lie/s in the xy-plane ?
(1) d_{xz} only (2) d_{xy} only
(3) $d_{x^2-y^2}$ only (4) d_{xy} and $d_{x^2-y^2}$

129. If E_1, E_2 and E_3 represent respectively the kinetic energies of an electron, an alpha particle and a proton each having same de Broglie wavelength then :
(1) $E_1 > E_3 > E_2$ (2) $E_2 > E_3 > E_1$
(3) $E_1 > E_2 > E_3$ (4) $E_1 = E_2 = E_3$

130. The radius of an electron is of the order of :
(1) 10^{-15} cm (2) 10^{-13} cm
(3) 10^{-12} cm (4) 10^{-10} cm

131. The probability of finding an electron residing in a p_x orbital is zero in the
(1) XY plane (2) YZ plane
(3) Y direction (4) Z direction

132. The orbital angular momentum of an electron in 2s orbital is
(1) $+\frac{1}{2}\frac{h}{2\pi}$ (2) $+\frac{h}{2\pi}$
(3) zero (4) $\sqrt{2}\frac{h}{2\pi}$

133. The de Broglie wavelength of a tennis ball of mass 60 g moving with a velocity of 10 metres per second is approximately
(1) 10^{-25} metres (2) 10^{-33} metres
(3) 10^{-31} metres (4) 10^{-16} metres

134. The maximum kinetic energy of the photoelectrons is found to be 6.63×10^{-19} J. When the metal is irradiated with a radiation of frequency 2×10^5 Hz. The threshold frequency of the metal is about
(1) $1 \times 10^{15}\ s^{-1}$ (2) $2 \times 10^{15}\ s^{-1}$
(3) $3 \times 10^{15}\ s^{-1}$ (4) $1.5 \times 10^{15}\ s^{-1}$

135. If the speed of electron in the Bohr's first orbit of hydrogen atom be x, then speed of the electron in second orbit of He^+ is
(1) x/2 (2) 2x
(3) x (4) 4x

136. The number of spectral lines that are possible when electrons in fourth energy level in different hydrogen atoms return to the ground state is
(1) 4 (2) 6
(3) 8 (4) 3

137. Lothar Meyer plotted a graph showing variation of
(1) Atomic volume with increase in atomic number
(2) Atomic volume with increase in atomic weight
(3) Atomic radii with increase in atomic weight
(4) Atomic weight with increase in atomic number

138. Which contains both polar and non-polar covalent bonds?
(1) NH_4Cl (2) HCN
(3) H_2O_2 (4) CH_4

139. Which of the following statements is incorrect ?
(1) There are eight elements in the third period of the periodic table
(2) Elements of group 1, 2, 13, 14, 15, 16, 17 are known as representative elements
(3) General electronic configuration of f-block elements is $(n-2)\ f^{1-14}\ (n-1)d^{0-1}\ ns^2$
(4) Among all the elements chlorine has the highest electron negativity

140. The lattice energy order for lithium halide is :
(1) LiF > LiCl > LiBr > LiI
(2) LiCl > LiF > LiBr > LiI
(3) LiBr > LiCl > LiF > LiI
(4) LiI > LiBr > LiCl > LiF

141. An element X occurs in shot period having configuration ns^2np^1. The formula and nature of its oxide are :
(1) XO_3, basic (2) XO_3, acidic
(3) X_2O_3, amphoteric (4) X_2O_3, basic

142. The electron affinity of the members of oxygen family follow the order :
(1) O > S > Se (2) S > O > Se
(3) S > Se > O (4) Se > O > S

143. General electronic configuration of ouermost and penultimate shell of an atom is $(n-1)s^2\ (n-1)\ p^6\ (n-1)d^x\ ns^2$. If n = 4 and x = 5, the number of proton in the nucleus is :
(1) > 25 (2) < 24
(3) 25 (4) 30

144. According to IUPAC norms a newly discovered element has been named as Uun. The atomic number of the element is
(1) 111 (2) 112
(3) 109 (4) 110

145. Which of the following is least stable ?
(1) $BeCO_3$ (2) $MgCO_3$
(3) $BaCO_3$ (4) $CaCO_3$

146. Consider the following hydrides
1. PH_3 2. AsH_3
3. SbH_3 4. BiH_3
The decreasing order of stability of the hydrides is
(1) $PH_3 > BiH_3 > SbH_3 > AsH_3$
(2) $PH_3 > AsH_3 > SbH_3 > BiH_3$
(3) $SbH_3 > AsH_3 > BiH_3 > PH_3$
(4) $BiH_3 > PH_3 > SbH_3 > AsH_3$

147. Whcih of the following order is incorrect?
(1) Acidic : $NH_3 < PH_3 < AsH_3$
(2) IE_1 : Li < Be < B < C
(3) Basic : $Al_2O_3 < MgO < Na_2O < K_2O$
(4) Ionic radius : $LI^+ < Na^+ < K^+ < Cs^+$

148. The stability of the following alkali metal chlorides follows the order
(1) LiCl > KCl > NaCl > CsCl
(2) CsCl > KCl > NaCl > LiCl
(3) NaCl > KCl > LiCl > CsCl
(4) KCl > CsCl > NaCl > LiCl

149. The order of increase of basicity is as follows
(1) MgO < BeO < CaO < BaO
(2) BeO < MgO < CaO < BaO
(3) BaO < CaO < MgO < BeO
(4) CaO < BaO < BeO < MgO

150. The statement that is not correct for periodic classification of element is
(1) The properties of elements are a periodic function of their atomic numbers
(2) Non-metallic elements are less in number than metallic elements
(3) The first ionization energies of elements along a period do not vary in a regular manner with increase in atomic number
(4) For transition elements, the d-subshells are filled with electrons monotonically with increase in atomic number

151. 2g of a base whose eq. wt. = 40 reacts with 3g of an acid. The eq. wt. of the acid is
(1) 40 (2) 60
(3) 10 (4) 30

152. Inert pair effect is exhibited by the element
(1) Ge (2) Pb
(3) B (4) Both (1) and (2)

153. Correct order of for acidic stength is :
(1) $CaO < CuO < H_2O < CO_2$
(2) $H_2O < CuO < CaO < CO_2$
(3) $CaO < H_2O < CuO < CO_2$
(4) $H_2O < CO_2 < CaO < CuO$

154. Trans uranic elements
(1) Are all man-made elements
(2) Include elements 104
(3) Have fixed valency
(4) None of these

155. Effective nuclear charge of an atom depends on
(1) The atomic number of the atom
(2) The charge of the ion
(3) The shielding constant
(4) Both the actual nuclear charge and the shielding constant

156. Alkali metals are powerful reducing agents because
(1) These are metals
(2) Their ionic radii are large
(3) These are monovalent
(4) Their ionisation potential is low

157. The correct order of relative stability of half filled and completely filled shell is :
(1) $p^3 < d^5 < d^{10} < p^6$ (2) $d^5 < p^3 < d^{10} < p^6$
(3) $d^5 < p^3 < d^{10} < p^6$ (4) $p^3 < d^{10} < d^5 < p^6$

158. The elements of 2nd short period are called
(1) Bridge elements
(2) Typical elements
(3) Transition elements
(4) Representative elements

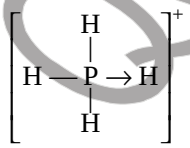
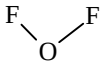
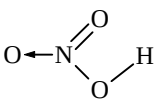
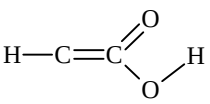
159. Which of the following oxides is most acidic ?
(1) Al_2O_3 (2) SiO_2
(3) P_2O_5 (4) SO_3

160. The screening effect of d-electrons is
(1) Much less than s-electrons
(2) Much more than s-electrons
(3) Equal to s-electrons
(4) Equal to p-electrons

161. The most favourable conditions for ionic bonding are
(1) Low charge on ions, large cation, small anion
(2) Low charge on ions, large cation, large anion
(3) High charge on ions, small cation, large anion
(4) High charge on ions, large cation, small anion

162. The X-axis is the molecular axis of a diatomic molecule then π molecular orbital are formed by overlap of
(1) s-atomic orbitals (2) s-and p_x orbitals
(3) p_y and p_y orbitals (4) p_x and p_z orbitals

163. Which of the following will provide the most efficient overlap ?
(1) s - s (2) s - p
(3) sp^2 - sp^2 (4) sp - sp

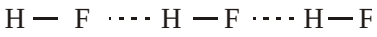
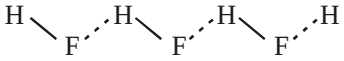
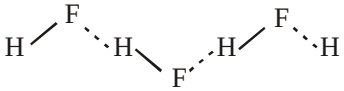
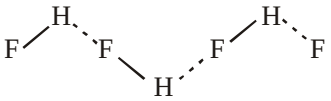
164. Which formulae does not correctly represents the bonding capacity of he atom involved?
(1)  (2) 
(3)  (4) 

165. The d-orbital involved in sp^3d hybridisation is
(1) $d_{x^2-y^2}$ (2) d_{xy}
(3) d_z^2 (4) d_{zx}

166. The geometrical arrangement and shape of I_3^- are respectively
(1) Trigonal bipyramidal geometry, linear shape
(2) Hexagonal structure, linear shape
(3) Octahedral structure, linear shape
(4) Tetrahedral geometry, pyramidal shape

167. A molecule has seven bond pairs around the central atom, the shape associated with the molecule is
(1) heptagonal
(2) octahedral
(3) pentagonal pyramidal
(4) pentagonal bipyramidal

168. Which is correct in the following :
(1) Radius of Cl atom is 0.99Å, while that of Cl^+ ion is
(2) Radius of Cl atom is 0.99Å, while that of Na atom is 1.54Å
(3) The radius of Cl atom is 0.95Å while that of Cl^- ion is 0.81Å
(4) Radius of Na atom is 0.95Å, while that of Na^+ ion is 1.54Å

169. The H-Bonds in solid HF can be best represented as:
(1) 
(2) 
(3) 
(4) 

170. In solid Argon the atoms are held by
(1) ionic bonds
(2) hydrogen bonds
(3) van der Waal forces
(4) co-ordinate bonds

171. Which sequence correctly describes a relative bond strength, of oxygen molecule, superoxide ion and peroxide ion ?

(1) $O_2 < O_2^- < O_2^{2-}$ (2) $O_2 > O_2^- > O_2^{2-}$

(3) $O_2 < O_2^- > O_2^{2-}$ (4) $O_2 > O_2^- < O_2^{2-}$

172. Among NO_3^- (I) ; AsO_3^{3-} (II), CO_3^{2-} (III) $ClCO_3^-$ (IV) and SO_3^{2-} (V). The multiplanar species are

(1) II, IV, V (2) III, IV

(3) I, II, V (4) II, III, IV

173. The nature of π-bonds in perchlorate ion

(1) O – Cl ($d_\pi - p_\pi$) (2) O – Cl ($p_\pi - d_\pi$)

(3) O – Cl ($d_\pi - d_\pi$) (4) None of these

174. The hybrid states of carbon in diamond, graphite and acetylene are respectively

(1) sp^2, sp, sp^3 (2) sp, sp^2, sp^3

(3) sp^3, sp^2, sp (4) sp^2, sp^3, sp

175. The ground state electronic configuration of N_2 molecule is written as KK $(\sigma_{2s})^2 (\sigma^*_{2s})^2 (\pi_{2p})^4 (\sigma_{2p_z})^2$

The bond order is

(1) 3 (2) 2

(3) 0 (4) 1

176. The order of O – O bond length in O_2, H_2O_2, O_3 is

(1) $O_2 > O_3 > H_2O_2$ (2) $O_3 > H_2O_2 > O_2$

(3) $H_2O_2 > O_3 > O_2$ (4) $O_2 > H_2O_2 > O_3$

177. Acetic acid exists as dimer in benzene due to :

(1) Condensation reaction

(2) Hydrogen bonding

(3) Presence of carboxyl group

(4) Presence of hydrogen atom at α-carbon

178. Which ion is isoelectronic with CO?

(1) CN^- (2) O_2^+

(3) N_2^+ (4) O_2^-

179. Dipole moment is shown by

(1) 1, 4-dichlorobenzene

(2) cis, 1, 2-dichloroethene

(3) trans 1, 2dichloroethene

(4) trans 2, 3-dichloro-2-butene

180. Among the following species, identify the isostructural pairs NF_3, NO_3^-, BF_3, H_3O^+, HN_3

(1) [NF_3, NO_3^-] and [BF_3, H_3O^+]

(2) [NF_3, HN_3] and [NO_3^-, BF_3]

(3) [NF_3, H_3O^+] and [NO_3^-, BF_3]

(4) [NF_3, H_3O^+] and [NH_3, BF_3]

181. The correct order of increasing C–O bond length of CO, CO_3^{2-}, CO_2 is

(1) $CO_3^{2-} < CO_2 < CO$ (2) $CO_2 < CO_3^{2-} < CO$

(3) $CO < CO_3^{2-} < CO_2$ (4) $CO < CO_2 < CO_3^{2-}$

182. KF combines with HF to form KHF_2. The compound contains the species

(1) K^+, F^- and H^+ (2) K^+, F^- and HF

(3) K^+ and $[HF_2]^-$ (4) $[KHF]^+$ and F_2

183. The common features among the species CN^-, CO and NO^+

(1) Bond order three and isoelectronic

(2) Bond order three and weak field ligands

(3) Bond order three and π-acceptors

(4) Isoelectronic and weak field ligands

184. Stability of hydrides generally increases with :

(1) Increase in bond angle

(2) Decrease in bond angle

(3) Decrease in resonance

(4) none of these

185. In the molecular orbital diagram for O_2^+ ion the highest occupied orbital is

(1) σ MO orbital (2) π MO orbital

(3) π^* MO orbital (4) σ^* MO orbital

186. HCl is covalent in the

(1) Aqueous solution (2) Ethereal solution

(3) Gaseous state (4) None of these

187. Potassium when burnt in air forms KO_2. What is the ground state electronic configuration of the superoxide ion(O_2^-) on the basis of MO theory ?

(1) KK $\sigma_{2s}^2 \sigma_{2s}^{*2} \sigma_{2p_z}^2 \sigma_{2p_x}^1 \sigma_{2p_y}^1$

(2) KK $\sigma_{2s}^2 \sigma_{2s}^{12} \sigma_{2p_z}^2 \pi_{2p_x}^2 \pi_{2p_y}^2 \pi_{2p_y}^*$

(3) KK $\sigma_{2s}^2 \sigma_{2s}^{*2} \sigma_{2p_z}^2 \pi_{2p_x}^2 \pi^2 \pi_{2p_x}^{*2} \pi_{2p_y}^{*2}$

(4) KK $\sigma_{2s}^2 \sigma_{2s}^{*2} \sigma_{2p_x}^2 \pi_{2p_x}^2 \pi_{2p_y}^2 \pi_{2p_x}^{*1} \pi_{2p_y}^{*1}$

188. The electron dot representation of covalent molecules

is also called

(1) Lewisite structure (2) Bohr's structure

(3) Lewis structure (4) Millikan's structure

189. Total number of sigma and pi bonds in $C_2(CN)_4$ is

(1) 9 σ and 9 π (2) 9 σ and 18 π

(3) 18 σ and 9 π (4) 18 σ and 18 π

190. Which of the following is diamagnetic ?

(1) O_2^+ (2) O_2

(3) O_2^- (4) O_2^{-2}

191. The correct order of increasing polar character is

(1) $H_2O < NH_3 < H_2S < HF$

(2) $H_2S < NH_3 < H_2O < HF$

(3) $NH_3 < H_2O < HF < H_2S$

(4) $HF < H_2O < NH_3 < H_2S$

192. The correct order of O – O bond length in O_2, H_2O_2 and O_3 is

(1) $O_2 > O_3 > H_2O_2$ (2) $O_3 > H_2O_2 > O_2$

(3) $H_2O_2 > O_3 > O_2$ (4) $O_2 > H_2O_2 > O_3$

193. The dipole moment of o-, m- and p-dichlorobenzene will be in the following decreasing order

(1) o > p > m (2) p > o > m

(3) m > o > p (4) o > m > p

194. Bond angle between two hybrid orbials i 105°. Hybrid character orbital is :

(1) Between 20– 21% (2) Between 19–20%

(3) Between 21–22% (4) Between 22–23%

195. K_{sp} is minimum for the compound

(1) $Mg(OH)_2$ (2) $Ca(OH)_2$

(3) $Ba(OH)_2$ (4) $Zn(OH)_2$

196. Ziese's salt contains

(1) Only ionic bonds

(2) Ionic and covalent bonds

(3) Ionic, covalent and coordinate bonds

(4) Hydrogen bonds

197. The dipole moment of HBr is 2.60×10^{-30} coulomb meter and the interatomic space is 1.41Å. The % ionic character of HBr will be

(1) 11.5% (2) 23%

(3) 5.75% (4) none of these

198. The dipole moment of O—H bond is 1.5 D and the experimental dipole moment of water molecule is 1.84 D. The $H\diagup O\diagdown H$ bond angle in water molecule will be

(1) 104° 20′ (2) 145°

(3) 90° (4) none of these

199. The boiling point of Kr and Rn are –152 °C and –62°C respectively. The approximate boiling point of Xe will be

(1) –107°C (2) –170°C

(3) –152°C (4) cannot be predicted

200. Superoxide have the group

(1) O_2^{-2} (2) O_2^-

(3) O^{-2} (4) O_2

p p

SUBJECTIVE QUESTIONS

1. One g of a metal carbonate gave 0.56 g of its oxide on heating. Determine the equivalent weight of the metals.
2. 2.2 g of a compound of phosphorus and sulphur has 1.24 g of P in it. Determine its empirical formula.
3. A signature written in carbon pencil weights 1 mg. Determine the number of carbon atoms present in the signature.
4. Show that O_2^+ and O_2^- ions have bond orders in the ratio of 5 : 3.
5. Which of the following are isoelectronic and isostructural NO_3^-, CO_3^{2-}, ClO_3^- and SO_3?
6. Determine the number of moles of H_2 in 0.24 litre of hydrogen gas at STP (assuming ideal gas behaviour).
7. Calculate the average velocity and the most probable velocity of a molecule of nitrogen at NTP.
8. Sodium vapours contain molecules of Na_2. How can you justify the formation of Na_2 ? What kind of bonding is present in Na_2 molecule.
9. Calculate he total kinetic energy of an ideal monoatomic gas at 27°C.
10. Arrange Al^{3+}, Mg^{2+}, K^+ and Li^+ in order of increasing ionic radii.
11. How many moles of CO_2 are contained in one litre of air if the volume content of CO_2 in air is found to be 0.03% at STP.
12. 1 g mixture of CuO and Cu_2O was quantitatively reduced to give 0.839 g of metallic copper. What was the weight of CuO in original sample ?
13. What is he quantum number of electron which is associated with energy of the H-atom is – 3.4 ev/atom.
14. A FCC lattice cube is formed by atoms A and B. If atom A is present at the corner of the cube and the atom B at the faces of the cube. Find out the formula of the comound.
15. A compound, formed by elements X and Y, crystallises in he cubic structure, where Y atoms are at the corner of a cube andX atoms are at alternate faces. What is the formula of the compound?
16. Calculate the packing fraction of Si unit cell, given that the unit cell content for Si is 8 and r = $\frac{\sqrt{3}}{8}a$
17. What is spin multiplicyt of Fe^{+++} cation.
18. Calculate the wavelength of an electron moving with a velocity of 10^8 m s^{-1}.
19. Why ammonum salt are much more soluble in water than the corresponding sodium salt.
20. Whnen 30 ml of ethanol and 30 ml of water is mixed, the volume of resulting solution is less than 60 ml.

ANSWERS

Quantum Success Mantraa: SCQ-NCERT Based

VOLUME - 1

1.	(1)	41.	(1)	81.	(3)	121.	(4)	161.	(1)
2.	(3)	42.	(4)	82.	(3)	122.	(3)	162.	(3)
3.	(2)	43.	(1)	83.	(3)	123.	(4)	163.	(4)
4.	(2)	44.	(3)	84.	(1)	124.	(3)	164.	(4)
5.	(1)	45.	(1)	85.	(4)	125.	(2)	165.	(1)
6.	(2)	46.	(3)	86.	(3)	126.	(1)	166.	(1)
7.	(3)	47.	(2)	87.	(3)	127.	(2)	167.	(4)
8.	(1)	48.	(3)	88.	(4)	128.	(3)	168.	(2)
9.	(2)	49.	(2)	89.	(1)	129.	(1)	169.	(3)
10.	(1)	50.	(3)	90.	(2)	130.	(2)	170.	(3)
11.	(3)	51.	(4)	91.	(3)	131.	(2)	171.	(2)
12.	(1)	52.	(1)	92.	(1)	132.	(3)	172.	(1)
13.	(1)	53.	(1)	93.	(2)	133.	(2)	173.	(2)
14.	(2)	54.	(1)	94.	(1)	134.	(1)	174.	(3)
15.	(2)	55.	(2)	95.	(3)	135.	(3)	175.	(1)
16.	(1)	56.	(2)	96.	(4)	136.	(2)	176.	(3)
17.	(1)	57.	(2)	97.	(1)	137.	(2)	177.	(2)
18.	(3)	58.	(4)	98.	(3)	138.	(3)	178.	(1)
19.	(4)	59.	(1)	99.	(2)	139.	(4)	179.	(2)
20.	(4)	60.	(2)	100.	(1)	140.	(1)	180.	(4)
21.	(2)	61.	(3)	101.	(1)	141.	(3)	181.	(4)
22.	(1)	62.	(2)	102.	(3)	142.	(2)	182.	(3)
23.	(1)	63.	(3)	103.	(1)	143.	(3)	183.	(1)
24.	(1)	64.	(1)	104.	(3)	144.	(4)	184.	(1)
25.	(1)	65.	(3)	105.	(1)	145.	(1)	185.	(3)
26.	(3)	66.	(2)	106.	(2)	146.	(2)	186.	(3)
27.	(3)	67.	(2)	107.	(2)	147.	(2)	187.	(3)
28.	(1)	68.	(3)	108.	(1)	148.	(1)	188.	(3)
29.	(2)	69.	(2)	109.	(2)	149.	(2)	189.	(1)
30.	(3)	70.	(3)	110.	(1)	150.	(4)	190.	(4)
31.	(1)	71.	(3)	111.	(2)	151.	(2)	191.	(2)
32.	(2)	72.	(2)	112.	(1)	152.	(2)	192.	(3)
33.	(2)	73.	(1)	113.	(3)	153.	(1)	193.	(4)
34.	(3)	74.	(1)	114.	(4)	154.	(1)	194.	(4)
35.	(4)	75.	(1)	115.	(2)	155.	(4)	195.	(4)
36.	(1)	76.	(2)	116.	(1)	156.	(4)	196.	(3)
37.	(2)	77.	(2)	117.	(4)	157.	(3)	197.	(1)
38.	(3)	78.	(1)	118.	(2)	158.	(2)	198.	(1)
39.	(4)	79.	(1)	119.	(2)	159.	(4)	199.	(1)
40.	(3)	80.	(4)	120.	(1)	160.	(2)	200.	(2)