I PUC - CHEMISTRY
SOME BASIC CONCEPTS OF CHEMISTRY

1. In an experiment it showed that 10 mL of 0.05 M solution of chloride required 10 mL of 0.1 M solution of $AgNO_3$, which of the following will be the formula of the chloride (X stands for the symbol of the element other than chlorine):
   a) X_2Cl b) X_2Cl c) XCl_2 d) XCl_4

2. How many moles of lead (II) chloride will be formed from a reaction between 6.5 g of PbO and 3.2 g of HCl?
   a) 0.044 b) 0.333 c) 0.011 d) 0.029

3. The total number of atoms of all elements present in mole of ammonium dichromate is
   a) 19 b) 6.023×10^{23} c) 114.473×10^{23} d) 84.322×10^{23}

4. 6.025×10^{20} molecules of acetic acid are present in 500 ml of its solution. The concentration of solution is
   (a) 0.002 M (b) 10.2 M (c) 0.012 M (d) 0.001 M

5. The mass of carbon anode consumed (giving only carbondioxide) in the production of 270 kg of aluminium metal from bauxite by the Hall process is (Atomic mass: Al = 27)
   a) 270 kg b) 540 kg c) 90 kg d 180 kg

6. An organic compound containing C, H and N gave the following analysis C = 40%, H = 13.33%,N = 46.67%. Its empirical formula would be
   (a) CH_4N (b) CH_5N (c) $C_2H_7N_2$ (d) C_2H_7N

7. If an experiment, 4 g of M_2O_x oxide was reduced to 2.8 g of the metal. If the atomic mass of the metal is 56 g mol^{-1}, the number of O atoms in the oxide is
   a) 1 b) 2 c) 3 d) 4

8. 1 mol of $KClO_3$ is thermally decomposed and excess of aluminium is burnt in the gaseous product. How many moles of Al_2O_3 are formed?
   (a) 1 (b) 2 (c) 1.5 (d) 3

9. What volume of oxygen gas (O_2) measured at 0°C and 1 atm, is needed to burn completely 1 L of propane gas (C_3H_8) measured under the same conditions?
   a) 7 L b) 6 L c) 5 L d) 10 L

10. 4 g of hydrogen reacts with 20 g of oxygen to form water. The mass of water formed is
    (a) 24 g (b) 36 g (c) 22.5 g (d) 40 g

11. Two metallic oxides contain 27.6% and 30% oxygen respectively. If the formula of the first oxide is X_3O_4, that
    of the second will be
    (a) XO (b) XO_2 (c) X_2O_5 (d) X_2O_3

12. Caffeine has a molecular mass of 194. If it contains 28.9% by mass of nitrogen, number of atoms of nitrogen in one molecule of caffeine is:
    a) 4 b) 6 c) 2 d) 3

13. The mass of CO_2 that shall be obtained by heating 10 kg of 80% pure limestone ($CaCO_3$) is:
a) 4.4 kg b) 6.6 kg c) 3.52 kg d) 8.8

14. A carbon compound containing carbon and oxygen has approximate molar mass equal to 290. On analysis it is found to contain 50% by mass of each element. Therefore molecular formula of the compound is:
a) $C_{12}O_9$ b) C_4O_3 c) C_3O_4 d) C_9O_{12}

15. In Haber process, 30 L of dihydrogen and 30 L of dinitrogen were taken for reaction which yielded only 50% of the expected product. What will be the composition of gaseous mixture under the aforesaid condition in the end?
a) 20 L ammonia, 10 L nitrogen, 30 L hydrogen
b) 20 L ammonia, 25 L nitrogen, 15 L hydrogen
c) 20 L ammonia, 20 L nitrogen, 20 L hydrogen
d) 10 L ammonia, 25 L nitrogen, 15 L hydrogen

16. The total number of electrons in 1.6 g of CH_4 to that in 1.8 g of H_2O
(a) Double (b) Same (c) Triple (d) One fourth

17. What volume of oxygen gas (O_2) measured at 0°C and 1 atm, is needed to burn completely 1 L of propane gas (C_3H_8) measured under the same conditions?
(a) 10 L (b) 7 L (c) 6 L (d) 5 L

18. The laboratory reagent, concentrated nitric acid, is generally 69 percent by mass of nitric acid (HNO_3). The volume of this solution which contains 19.9 g of HNO_3 (density of concentrated nitric acid solution is 1.41 g cm^{-3}).
a) 19.9 b) 20.4 c) 22.4 d) 23.4

19. 100 mL solution of NaOH (containing 4 g NaOH per litre) and 50 mL of HCl (containing 7.3 g HCl per litre) react as: $NaOH\ (aq) + HCl\ (aq) \rightarrow NaCl\ (aq) + H_2O\ (\ell)$ 0.5 g of NaCl is formed. Thus, unreacted NaOH is:
a) 0.058 g b) 3.66 g c) 10.8 g d) 0.63 g

20. $CaCO_3$ is decomposed by HCl (density 1.825 g/cc)
$CaCO_3 + 2HCl \rightarrow CaCl_2 + H_2O + CO_2$
Volume of HCl required to decompose 10 g of 50% pure $CaCO_3$ is :
a) 1.825 mL b) 3.65 mL c) 0.9125 mL d) 2 mL

21. 10 L of hard water with temporary hardness [of $Ca(HCO_3)_2$] required 0.56 g of lime
: $Ca\ (HCO_3)_2 + CaO \rightarrow 2CaCO_3 + H_2O$
Temporary hardness in terms of ppm of $CaCO_3$ is :
a) 56 b) 1/2 c) 100 d) 200

22. The formula weight of an acid is 82.0. In a titration 100 cm^3 of a solution of this acid containing 39 g of the acid per litre were completely neutralised by 95 cm^3 of aqueous NaOH containing 40g of NaOH per litre. The basicity of the acid is
a) 1 b) 2 c) 3 d) 4

23. The mass of 70% H_2SO_4 by mass required for neutralization of 1 mol of NaOH is
a) 49 g b) 98 g c) 70 g d) 34.3 g

24. 0.24 gm of divalent metal when treated with excess of dilute sulphuric acid yield 112 c.c of dry hydrogen at STP. The atomic weight of the metal will be
a) 24 b) 48 c) 72 d) 96

25. 3g of an oxide of a metal is converted to chloride completely, and it yielded 5g of chloride. The equivalent mass of metal is
a) 20 b) 12 c) 3.25 d) 33.25

26. What volume of NH_3 gas at S.T.P would be needed to prepare 100 mL of 2.5 molal (2.5 m) ammonium hydroxide solution?
a) 0.056 litres b) 0.56 litres c) 5.6 litres d) 11.2 litres

27. The number of $C_2O_4^{2-}$ ions in 100 ml of 0.2 M aqueous $Na_2C_2O_4$. Assume complete ionisation.
a) 1.24×10^{22} b) 1.24×10^{23} c) 12.4×10^{22} d) 12.4×10^{23}

28. Out of 6×10^{22} N_2 molecules 700 mg are removed. How many grams of H_2 is required to convert rest of nitrogen into ammonia?
a) 0.222g b) 0.444g c) 0.666g d) 0.888g

29. Equal volumes of 0.1 M $AgNO_3$ and 0.2 M NaCl are mixed. The concentration of NO_3^- ions in the mixture will be
a) 0.1 M b) 0.05 M c) 0.2 M d) 0.15 M

30. If LPG cylinder contains mixture of butane and isobutane, then the amount of oxygen that would be required for combustion of 1 kg of it will be
a) 1.8 kg b) 2.7 kg c) 4.5 kg d) 3.58 kg

31. The total mass of a mixture containing $CaCl_2$ and NaCl is 4.22 g. Calcium is precipitated as calcium carbonate, which on strong heating formed 0.959g of CaO. The percentage of $CaCl_2$ in the mixture
a) 35 b) 65 c) 55 d) 45

32. A gaseous mixture contains 30% H_2 , 60% CH_4 and 10% oxygen. The additional volume of oxygen required for complete combustion of 300 mL of the above gaseous mixture IS
a) 375mL b) 30.3mL c) 405mL d) 40.5mL

33. Two metallic oxides contain 27.6% and 30.0% oxygen respectively. If the formula of the first oxide is M_3O_4, that of the second will be
a) MO b) MO_2 c) M_2O_5 d) M_2O_3

34. The density of a DNA sample is 1.1 g cm^{-3} and its molar mass determined by cryoscopic method is found to be 6.0×10^8 g mol^{-1}. What is the volume occupied by one DNA molecule
a) 1.0×10^{-15} cm^3 b) 2.0×10^{-15} cm^3 c) 3.0×10^{-15} cm^3 d) 0.17×10^{-23} cm^3

35. The decomposition of a certain mass of $CaCO_3$ gave 11.2 dm^3 of CO_2 gas at STP. The mass of KOH required to completely neutralize the gas is
a) 56 g b) 28 g c) 42 g d) 20 g

36. The weight of the molecule of a compound $C_{60}H_{122}$ is
a) 1.30×10^{-20} g b) 5.01×10^{-21} g c) 3.72×10^{23} d) 1.4×10^{-21} g

37. How much time (in hours) would it take to distribute one Avogadro number of wheat grains if 10^{20} grains are distributed each second?
a) 0.1673 b) 1.673 c) 16.73 d) 167.3

38. A person adds 1.71 gram of sugar ($C_{12}H_{22}O_{11}$) in order to sweeten his tea. The number of carbon atoms added are (mol. Mass of sugar = 342)
a) 3.6×10^{22} b) 7.2×10^{21} c) 0.05 d) 6.6×10^{22}

39. From 392 mg of H_2SO_4, 1.204×10^{21} molecules are removed. The moles of H_2SO_4 left is
a) 2.0×10^{-3} b) 1.2×10^{-3} c) 4.0×10^{-3} d) 1.5×10^{-3}

40. Which of the following pairs have the same number of atoms?
(a) 16 g of O_2 (g) and 4 g of H_2 (g) (b) 16 g of O_2 and 44 g of CO_2
(c) 28 g of N_2 (g) and 32 g of O_2 (d) All

41. A bivalent metal has an equivalent mass of 32. The molecular mass of the metal nitrate is
(a) 168 (b) 192 (c) 188 (d) 182

42. The moles of O_2 required for reacting with 6.8 g ammonia
(…NH_3 + …. O_2 + →…. NO + … H_2O) is
(a) 5 (b) 2.5 (c) 1 (d) 0.5

43. If the density of methanol is 0.793 kg L^{-1}, what is its volume needed for making 2.5 L of its 0.25M solution?
(a) 5 mL (b) 25.2 ml (c) 50 ml (d) 2.52 ml

44. The equivalent weight of a metal is 4.5 and the molecular weight of its chloride is 80. The atomic weight of the metal is
a) 18 b) 9 c) 4.5 d) 36

45. 1.575 g of a dibasic acid is neutralized by 25mL of 1M NaOH solution. Hence molar mass of dibasic acid is
a) 126gmol $^{-1}$ b) 63 g mol $^{-1}$ c) 12.6 g mol $^{-1}$ d) 1.26g mol $^{-1}$

46. The average molar mass of a mixture of methane and ethene present in the ratio a : b is found to be 20.0 g mol^{-1}. If the ratio were reversed, the molar mass of the mixture would be

47. 13.5g of Aluminium when changes to Al^{+3} ion in solution, will have …..electrons
a) 9.033×10^{23} b) 6.033×10^{23} c) 9.033×10^{22} d) 6.033×10^{22}

48. A gaseous mixture contains CH_4 and C_2H_6 in equimolecular proportion. The weight of 2.24 litres of this mixture at NTP is :
a) 4.6 g b) 1.6 g c) 2.3 g d) 23 g

49. 81.4 g sample of ethyl alcohol contains 0.002 g of water. The amount of pure ethyl alcohol (to the proper number of significant figures) is :
a) 81.398 g b) 81.40 g c) 81.4 g d) 81 g

50. One gram of a chloride was found to contain 0.835 g of chlorine. Its vapour density is 85. Molecular formula of the compound is
a) MCl_3 b) MCl_2 c) MCl_3 d) MCl