SUBJECT: CHEMISTRY
Stoichiometry

1. Find the number of Iodine atoms present in 40ml of its 0.1 M solution

    a) 48.1×10^{20} b) 4.81×10^{20} c) 6.02×10^{23} d) None of these

2. The mass of one molecule of compound $C_{20}H_{122}$

    a) $1.2 \times 10^{-20}g$ b) $1.4 \times 10^{-21}g$ c) 5.025×10^{23} d) $6.02 \times 10^{23}g$

3. What will be the of mass of nitric acid dissolved per litre of the solution of 25ml of this solution that neutralises 20 ml of 0.15 N NaOH

    a) 63 g   b) 0.12 g   c) 7.56g   d) 15.012g

4. The number of gram molecules of Chlorine in 6.02×10^{25} hydrogen chloride molecule is

    a) 100   b) 10   c) 5   d) 50

5. Which one of the following has maximum number of atoms of oxygen

    a) 2 g of carbon dioxide   b) 2 g of carbon monoxide
    c) 2g of water   d) 2 g of sulphur dioxide

6. Given the abundances of isotopes of ^{54}Fe , ^{56}Fe & ^{57}Fe are 5%, 90% & 5 % respectively, the atomic mass of Fe is

    a) 55.85   b) 55.95   c) 55.75   d) 56.05

7. $20 \ cm^3$ of 0.2M $Al_2(SO_4)_3$ is mixed with $20cm^3$ of 0.6M $BaCl_2$ concentration of Al^{3+} ions in the solution will be
    a) 0.2 M   b) 10.3 M   c) 0.1M   d) 0.25 M

8. What volume of hydrogen gas at 273K and I atm pressure will be consumed in obtaining 21.6g elemental boron (at. mass = 10.8) from the reduction of boron trichloride using hydrogen

    a) 67.2 L   b) 44.8 L   c) 22.4 L   d) 89.0 L

9. The density of oxygen gas at 50°C and atmospheric pressure was found to be 1.2 g/ dm^3. Under these conditions the molar volume in dm^3 is

   a) 13.3   (b) 22.4   (c) 26.5   (d) 32.0

10. The mole fraction of water in 20% aqueous solution of Hydrogen Peroxide is

   a) 77/68   (b) 68/77   (c) 20/80   (d) 80/20

11. 0.023g of sodium metal is reacted with 100 cm^3 of water. The pH of the resulting solution is

   (a) 11   (b) 10   (c) 12   (d) 9

12. The mass of $CaCO_3$ that completely reacts with 1dm^3 of 1N Hydrochloric acid is

   (a)   100 g (b) 50g   (c) 25g   (d)10 g

13. The total number of electrons in 18 ml of water is

   a) 6.02 x 10^{23} (b) 6.02 x 10^{22} (c) 6.02x10^{24} (d) 6.02x10^{25}

14. Volume of Carbon dioxide liberated in cm^3 at STP when 2.0g of limestone containing 50% of $CaCO_3$ is completely decomposed is

   (a) 224   (b) 112   (c) 336   (d) 448

15. A gaseous mixture containing oxygen and sulphur dioxide in equimolar proportions. Mass of 2.24dm^3 of this mixture at STP is

   (a) 3.2 g   (b) 4.8 g   (c) 6.4 g   (d) 9.6 g

16. How many moles of electrons weigh one kilogram

   (a) 6.023 x 10^{23} (b) (1/9.108) x 10^{31} (c) (6.023/9.108) x 10^{31} (d) (1/6.023x9.108) x 10^8

17. 0.04g of pure NAOH is dissolved in 10 litres of distilled water. The pH of the solution is

   (a) 9   (b) 10   (c) 11 (d) 12

18. Mole fraction of the solute in a 1.00 molal aqueous solution is

   (a) 0.0177   (b) 0.0344   (c) 1.77   (d) 0.1770

19. An alloy of iron (55.8%) has density of 8.17g/c.c. No. of moles of iron present in the alloy measuring 10cm x 10cm x 10cm are (at mass of Fe =55.8)

(a) 163.4   (b) 81.7   (c) 8.17   (d) 16.34

(20) Zinc and aluminium metals produces hydrogen gas with dilute sulphuric acid. The ratio of moles of H_2 produced when 1 mole of each reacts with excess of dilute H_2SO_4 will be

(a) 1 : 1. 5   (b) 3:1
(c) 1 : 3   (d) 1:2

(21) The number of moles of $KMnO_4$ that will be required to react with one mole of sulphite ion in acidic medium is

(a) 1   (b) 3/5
(c) 4/5   (d) 2/5

(22) Out of the following, the largest number of atoms are contained in

(a) 11 g of CO_2 (b) 4 g of H_2
(c) 8.5 g of NH_3 (d) 8 g of SO_2

(23) An aqueous solution of 6.3g of oxalic acid dihydrate is made upto 250ml. The volume of 0.1N NaOH required to completely neutralise 10ml of this solution is

(a) 40 ml   (b) 20 ml
(c) 10 ml   (d) 4 ml

(24) 500 ml of 4.0 molar aqueous solution of NaCl is electrolysed. This leads to the evolution of chlorine gas at one of the electrodes (atomic mass of Na =23, Hg =200, 1F =96500C)
The total number of moles of chlorine gas evolved is

(a) 0.5   (b) 1.0   (c) 2.0   (d) 3.0

25) 0.5 M of H_2SO_4 is diluted from 1 litre to 10 litre, Normality of resulting solution is

(a) 0.1 N   (b) 1 N   (c) 10 N   (d) 11 N

States of matter

1. 3.2 g of oxygen and 0.2 g of hydrogen are placed in a 1.12L flask at 0ºC. The total pressure of the gaseous mixture will be

    a) 1 atm   b) 4 atm   c) 3 atm   d) 2 atm

2. Containers A & B have same gas. Pressure, Volume & Temperature of A are all twice that of B. Then the ratio of the number of molecules of A & B are

    a) 1:2   b) 2:1   c) 1:4   d) 4:1

3. An ideal gas obeying kinetic gas equation

    a) can be liquefied if its temperature is more than critical temperature
    b) Can be liquefied at any value of T and P
    c) Can not be liquefied under any value of T and P
    d) Can be liquefied if its pressure is more than critical pressure

4. A gas is found to have a density of 1.8g/L at 1 atm pressure and 27 ºC. The gas will be

    a) N_2 b) CO   c) CO_2 d) SO_2

5. The vapour density of a gas is 11.2. The volume occupied by 11.2g of this gas at S.T.P is

    a) 2.4 L   b) 11.2 L   c) 2 L   d) 20 L

6. The time taken for a certain volume of a gas to diffuse through a small hole was 2 min. Under similar conditions an equal volume of oxygen took 5.65 min to pass. The molecular mass of this gas is

    a) 32   b) 11.33   c) 4   d) 8

7. The ratio of root mean square velocity of methane at 200K and Sulphur dioxide at 800K is

    a) 2:3   b) 1:1   c) 2:1   d) 1:2

8. Co $_2$ diffuses 2 times faster than a gas .The molecular mass of the gas is

    a) 22   b) 44   c) 88   d) 176

9. The RMS velocity of an ideal gas at 27°C is 0.3 m/s. Its RMS velocity at 927° C is (in m/ s) '

   a) 3.6   b) 2.4   c) 0.9   d) 0.6

10. Equal masses of methane and hydrogen are mixed in an empty container at 25°C.   The fraction of the total pressure extracted by hydrogen is

    a) ½   b) 8/9   c) 1/9   d) 16/17

11. At 27°C a gas was compressed to half of its volume. To what temperature must it now be heated so that it occupies just original volume

    a)54 °C   b) 327 °C   c) 500K   d) 327K

12. Force of attraction and volume of the gas can be neglected at

    a) high pressure b) low pressure c) low pressure & high temperature
    d) high pressure and low temperature

13. In the equation of PV= nRT which one cannot be the numerical value of R

    a) 8.3×10^{7} erg/ K/ mol   b) 8.31×10^{7} dyne cm /K/mol
    c) 8.31 J/K/ mol   d) 8.31atm/K/mol

14. In a closed container a certain amount of N_2O_4 is maintained at 0°C. At 273 °C the N_2O_4 is completely dissociated   to NO_2 molecules. What will be its pressure as compared to previous pressure

    a) double   b) three times   c) 4 times   d) same

15. The kinetic energy of N molecules of 0_2 is x joule at -123 °C. .Another sample of 0_2 at 27 °C has a kinetic energy of 2x joule the lather sample contains

    (a) N molecules of 0_2 (b) 2 N molecules of 0_2
    (c) N/2 molecules of 0_2 (d) N/4 molecules of 0_2

16. Equal weight s of two gases of molecular weight 4 and 40 are mixed. The pressure of the mixture is 1.1 atmosphere. The partial pressure of the light gas in this mixture is

    (a) 0.55 atm   (b) 0.11 atm
    (c) 1 atm   (d) 0.21 atm

17. The rate of diffusion of gas is proportional to

   (a) $p/\sqrt{d}$
   (b) p/d
   (c) $\sqrt{(p/d)}$
   (d) $\sqrt{p}/d$

18. Compressed oxygen is sold at a pressure of 100 atmosphere is in a cylinder of 49 liter   the number of moles of oxygen in the cylinder is

   (a) 400   (b) 100   (c) 300   (d) 200

19. 273 ml of a gas at STP was taken to 27 ºC and 600 mm pressure. The final volume of the gas would be

   (a) 273 ml
   (b) 300 ml
   (c) 380 ml
   (d) 586 ml

20. The ratio of rate of diffusion of a given element to that of helium is 1.4. The molecular mass of the given element is

   (a) 2   (b) 4   (c) 8   (d) 16

21. A gaseous mixture was prepared by taking equal mole of CO and N_2. If the total pressure of the mixture was 1 atmosphere, the partial pressure of N_2 in the mixture is

   (a) 0.8 atm   (b) 0.9 atm   (c) 1 atm   (d) 0.5 atm.

22. By what   factor does the root near square velocity of gaseous molecule increase   when the temperature (in Kelvin) is doubled

   (a) 2.8   (b) 4.0   (c) 1.4   (d) 2.0.

23. At relatively high pressure, the Vander-waals equation for one mole of a gas reduces to

   (a) PV =RT -a/V   (b) PV =aRT/V^2
   (c) P= RT –a/V^2 (d) PV = RT + Pb

(24) As the temperature is raised from 20^0C to 40^0C the average kinetic energy of Neon atoms changes by a factor of
   (a) 1/2
   (b) $\sqrt{313/293}$
   (c) 313/293
   (d) 2

(25) The ratio of kinetic equation of 3g of hydrogen and 4g of oxygen at TK is
   (a) 12:1
   (b) 6:1
   (c) 1:6
   (d) 24:1