THE GURUKUL INSTITUTE

PLOT 5C, 2ND FLOOR, COMPLEX, SEC-13, OPP. JAIPURIA SCHOOL,
VASUNDHARA,GHAZIABAD (U.P).CELL;9810780903

Mole Concept, Balancing of Reactions & Gas Laws
Dalton's Atomic Theory

1.If you won 1 mole of Rupee in a lottery the day you were born and spent a billion rupees every second, how much percentage still you have the prize money the day when you will die at the age of ninety years.

2.(i) What is the mass of 3.01×10^{23} molecules of ammonia?

(ii)How many molecules and atoms are present in 11.2 litre of chlorine at STP?

Mole and Molar Volume

1.In order to get 1 mole of ammonia how many moles of nitrogen is needed?

2.The number of atoms present in 11.2 L of SO_2 at STP is?

3.The volume of gas at STP is 1.12×10^{-7} ml. Calculate the number of molecules present in the gas.

4.The volume (inL) of CO_2 liberated at STP when 10g of 90% pure lime stone is heated completely is?

5. 44.8 litre of CO_2 at STP is obtained by heating x gm of pure $CaCO_3$. x is

6.(i) Calculate the mass of ammonia that can be produced from 50.0g of hydrogen in the reaction

$$N_2 + 3H_2 \rightarrow 2NH_3$$

(ii) One mole of mixture of CO and CO_2 requires exactly 20 grams of NaOH to convert all the CO_2 into Na_2CO_3. How many more grams of NaOH would it require for conservations into Na_2CO_3 if the mixture (one mole) is completely oxidized to CO_2?

(iii) Arrange the following in decreasing number of O atoms:

a)10 molecules of potash alum

b) 10 moles of potash alum

c) 10 grams of potash alum

d) 10 kilograms of potash alum

[Potash alum = $K_2SO_4.\ Al_2(SO_4)_3.24H_2O$]

Empirical and Molecular Formula

1.An inorganic salt gives the following percentage composition:-

Na = 29.11, S = 40.51 and O = 30.38. Calculate the empirical formula of the salt.

2.38 g of uranium was heated strongly in a current of air. The resulting oxide weighed 2.806 g. Determine the empirical formula of the oxide.

(At mass U = 238; O = 16).

Stoichiometry

1. Let's predict the amount of oxygen that must be inhaled to digest 1000 g for sugar our body burns. The sugar burns according to the following equation

$C_{12}H_{22}O_{11}(s) + 102_2(g) \longrightarrow 12CO_2(g) + 11H_2O(\ell)$

2. (I) Calculate the amount of NH_3 and O_2 needed to prepare 3 g of nitrogen oxide by the following reaction

$4NH_3(g) + 5O_2(g) + 6H_2O(g)$

(II) Calculate the mass of sulphuric acid, that can be produced from 25 kg of sulphur in the following reaction:

$2S + 3O_2 + 2H_2O \rightarrow 2H_2SO_4$

Limiting Reagent

3. Concentrated sulfuric acid is 96% H_2SO_4 by mass (The remaining 4.0% is water). Calculate the number of moles of H_2SO_4 in a litre of conc. Sulfuric acid if the density of this solution is 1.84 g/cm^3.

4. If 6.3 g of $NaHCO_3$ are added to 15.0 g of CH_3COOH solution, the residue is found to weigh 18.o g. What I the mass of CO_2 released in the reaction?

$CH_3COOH + NaHCO_3 \rightarrow CH_3COONa + H_2O + CO_2$

Concentration Units

1. A solution is prepared by dissolving 36.5 g of NaOH in distilled water to give 1.00 litre of solution. Calculate the molarity of NaOH in the solution.

2. Commercially available concentrated hydrochloric acid contain 38% HCl by mass.
(I) What I the molarity of this solution? The density is 1.19 gcm^{-3}.
(II) What volume of concentrated hydrochloric acid is required to make 1.00 L of 0.10 M HCl?

3. Calculate the mole fraction of each species when 2 g of He is mixed with 7 g of N_2.
4. What is the mole fraction of N_2 when it 6.023×10^{22} molecules are mixed (at NTP) with 2 g He and 8 g of O_2?

5. Mole fraction of I_2 in C_6H_6 is 0.2. Calculate molality of I_2 in C_6H_6.
6. What I the molality of 98% H_2SO_4 by weight?

PROBLEMS
(SUBJECTIVE)

1. How many atoms and moleculae of sulphur are present in 64.0 g of sulphur ($_8$)?
2. Calculate the mass of
(i)0.1 mole of KNO_3 (ii) 1×10^{23} molecules of methane and (iii) 112 cm^3 of hydrogen at STP.
3. Calculate the percentage composition of the various elements in $MgSO_4$.

4. A crystalline salt on bei9ng rendered anhydrous loses 45.6% of its weight. The percentage composition of the anhydrous salt is
Aluminium = 10.50% Potassium = 15.1%; Sulphur = 24.96%; Oxygen = 49.92%.
Find the simplest formula of the anhydrous crystalline salt.

5. Calculate the mass of iron which will be converted into its oxide(Fe_3O_4) by the action of 18 g of steam on it.
6. Calculate carbonate reacts with aqueous HCl according to the reaction

$CaCO_3(s) + 2HCl\ (aq) \rightarrow CaCl_2(aq) + C)_2(g) + H_2O(\ell)$
What mass of $CaCO_3$ is required to react completely with 25 mL of .75 M HCl?

7. If the 36.5 gm of NaOH is dissolved in water to give 200cc of solution then what will be the molarity of solution?
8. Calculate how many moles and how much grams of NaOH is present in 250 cc of a 0.5 M NOH solution.

9. 20 ml of H_2 an 50 ml O_2 are mixed and exploded at STP. If water is the only product formed, calculate the number of molecules of water produced?
10. Calculate the mole fraction of H_2SO_4 in its aqueous solution of density 2.08 g/cc t 4^oC
(assume H_2SO_4 solute to be solid).

ASSIGNMENTS

Assignment – I

1. What is the mass of one mole of electrons? Mass off one electron is 9.11 × 10-31 kg.
2. Simplest formula of the compound containing 60% of element A (At. wt.10) and 40% of element B (At. wt.20) is
3. Calculate the number of water molecules in a drop water weighing 0.05 g. If the drop evaporates in one hour, how many water molecules leave the liquid surface in one second.

4. 0.005 cm thick coating of silver is deposited on plate of 0.5 m^2 area. Calculate the number of silver atoms deposited on the plate. Atomic mass of Ag is 108 and its density is 7.9 g/cc.
5. What volume of CCl_4 having density 1.5 g/cc contains 1×10^{25} chlorine atoms.

6. A complex of iron contains 45.6% iron by mass. Find out of iron atoms in 5.00 g of this complex.
7. The percentage composition of Mohr's salt in a follows
Fe^{2+} = 14.32%, NH_4^+ = 9.20%, $SO^{2-}{}_4$= 49%, rest being water of crystallization. Find the empirical formula of Mohr's salt.

8. An impure sample of NCl, which weighed 0.05 g, gave on treatment with excess of $AgNO_3$ solution, 0.90g of AgCl as precipitate. Calculate the percentage purity of the sample.
9. Calculate the molarity of 20% solution of KOH by mass whose density is 1.02 g mL^{-1}.
10. 100 mL of 0.1 M NaCl solution is mixed with 100 mL of 0.2 M $AgNO_3$ solution. Find out the mass of AgCl precipitate formed. Which reactant is acting as limiting reagent?

Assignment – II

1. 6.023×10^{20} molecules of a substance weight 44 mg. ……..is the molar mass of the substance.
2. ……..atoms of oxygen are present in 300 g of $CaCO_{3+}$.
3. Mass of one atom of calcium is…….,if atomic weight is 40 g mol^{-1}.
4. The number of atoms and molecules of nitrogen in 224 mL of nitrogen at STP are……and……..respectively.

5. ……..grams of calcium is present in $Ca(NO_3)$ that contains 42 g of nitrogen.
6. The percentage of oxygen in $CuSO_4 . 5H_2O$ is……..

7. An oxide of nitrogen with molecular mass 92 has 30.4% nitrogen. Then molecular formula is……
8. ……..grams of HCI are required to prepare 4 litres of 5M HCI in water.
9. 100 mL on 10 M HCI are diluted with distilled water to volume of 2 litres. The molarity of the resultant solution is……..

Assignment – III
True/False Type

1. Total number of atoms present in 25.0 mg of camphor $C_{10}H_{16}O$ is $9.89 \times 10_{20}$.
2. $6.023 \times 10_{23}$ molecules of (OH) react6 with 3.01×10^{22} molecules of HCI, number of moless of $CaCl_2$ obtained are o.o5.
3. Number of atoms in 22 g of CO_2 is $3 \times 6.023 \times 10^{23}$.
4. 3 g Be contains 2.0×10^{23} atoms.
5. Molar mass is mass of one molecule.
6. On heating 100 kg limestone ($CaCO_3$) 56 kg of CaO liberated.

7. Chlorophyll contains 2.68% of magnesium by mass. The number of magnesium atoms in 3.00 g of chlorophyll is 2.01×10^{21} atoms.
8. Simpest6 formulae of a compound containing 50% of element X (atomic weight is 10) and 50% of element Y (atomic weight) 20) is X_2Y_3.

9. A copper sulphate solution contains 1.595% of $CuSO_4$ by weight. Its density is 1.2 g/mL, Its molarity will be 0.12
10. 112.6 grams of phosphoric acid (H_3PO_4) be needed to neutralize 100 g of magnesium hydroxide ($Mg(OH)_2$).
$2H_3PO_4 + 3Mg(OH)_2 \rightarrow Mg_3 (PO_4)_2 + 6H_2O$

Assignment – IV
Multiple Choice Questions (Single Option Correct)

1. How many g of KCI would have to be dissolved in 60 g H_2O to give 25% by wt. of solution?
(A) 20 g (B) 1.5 g (C) 11.5 g (D) 31.5 g
2. If 1 mole of ethanol (C_2H_5OH) completely burns to CO_2 nd H_2O, the weight of CO_2 formed is about.
(A) 22 g (B) 45 g (C) 66 g (D) 88 g

3. When 10 g of propane is made to react with 4 g of O_2 then weight of CO_2 produced will be
(A) 9.98 g (B) 3.3 g (C) 4.4 g (D) 5.5 g
4. 1.12 mL of gas is produced at STP by the action of 4.12 mg of alcohol, RHO with methyl magnesium iodide. The molecular mass of alcohol is [ROH + CH_3MgI $CH_4\uparrow$ + R~~OHIN~~gI]
(A) 16.0 (B) 41.2 (C) 82.4 (D) 156.0

5. 2 mol of H_2S and 11.2 L SO_2 at N.T.P reacts to from x mol of suphur; x is
$SO_2 + 2H_2S \rightarrow 3S + 2H_2O$
(A) 1.5 (B) 3 (C) 11.2 (D) 6
6. How many grams of NaOH will needed to prepare 250 mL of 0.1 M solution?
(A) 1 g (B) 10 g (C) 4 g (D) 6 g

7. An ore contains 1.34% of the mineral argentite, Ag_2, by weight. How many grams of this ore would have to be processed in order to obtain 1.00 g of pure solid silver, g?
(A) 74.6 g (B) 85.7 g (C) 134.0 g (D) 171.4 g
8. Hydrogen evolved at NTPP on complete reaction of 27 gm of AI with excess of aq. NaOH would be
(Chemical reaction: $2AI + 2NaOH + 2H_2O \rightarrow 2NaAIO_2 + 3H_2$)
(A) 22.4 litre (B) 44.8 litre (C) 67.2 litre (D) 33.6 litre

9. 12 g of Mg (At mass = 24) will react with an acid to give
(A) one mole of H_2 (B) one mole of O_2
(C) half mole of H_2 (D) half mole of O_2

SOME TYPICAL QUESTIONS

1. From 200 mg of CO_2, 10^{21} molecules are removed, how many moles of CO_2 are left.
2. Compound X contains 0.25% iron by mass. The molecular mass of X is 89600. Calculate the number of iron atoms per molecule of X.
3. What mass of aluminium is needed to react with 10.0 kg of chromium (III) oxide to produce chromium metal? The chemical equation for the reaction is;
$2AI + CrO_3$……..$AI_2O_3 + 2Cr$
(Cr = 52, AI = 27, O = 16)

4. 150 m of M/10 HCl is required to react completely with 1.0g of a sample reagent of limestone. Calculate the percentage purity of calcium carbonate.
5. $C_2HF_3 + HF \rightarrow C_2H_2F_4$
What mass of $C_2H_2F_4$ can be produced and what mass of excess reagent at the end of reaction if 1000.0 g of C_2HF_3 is mixed with 30.12 g of HF.
6. A sample of mixture of NaCl and NaBr weighing 0.180 g is treated with $AgNO_3$ solution to give 0.3715 g of precipitate. Calculate the content of NaCl and NaBr in the mixture.
(Ag = 108, CI = 35.5, Br = 80, Na = 23, N = 14)

BALACING OF REACTIONS

OXIDATION NUMBER OR OXIDATION STATE

1. Calculate the oxidation number of the underlined elements in the following species
(A) (B) (C) (D)
2. What is the oxidation number of Mn in $MnSO_4$ and Mn_3O_4?
3. Calculate the oxidation number of the underlined elements in the following species
(i) (ii) (iii) (iv) (v)

BALANCING OF REDOX REECTION

4. Balance the equation (in basic medium)
5. Balance the equation (in acidic medium)
6. (i) Balance the following redox equations by ionic method in acid medium:
$MnO_4 + C_2O_4^{2} + H^{+} \rightarrow Mn^{2+} + CO_2 + H_2O$
(ii) Balance the following equation using basic medium:
$Zn + NO_3 \rightarrow ZnO_2^{2} + NH_3$

SOLVED PROBLEMS

1. Arrange the following in order of
(a) Increasing oxidation number : $MnCl_2$, MnO_2, $Mn(OH)_3$, $KMnO_4$
(b) Increasing oxidation number: HIO_4, ICl, HI, I_2
(c) Decreasing oxidation number: HXO_4, HXO, HXO_3, HXO_2

2. Find the oxidation state of $Na_2S_2O_2$(Hypo).
3. Balance the equation: $H_2S + HNO_3 \rightarrow NO + S + H_2O$
4. Balance the equation: (in acidic medium)
$Cr_2O_7^{2} + C_2O_4^{2-} + H^+ \rightarrow Cr^{+3} + CO^2 + H_2O$

5. Find the oxidation state of Mn and Cr in the following species
(i) MnO_4^- (ii) $Cr(CN)^{-2}_6$ (iii) CrO_2Cl_2
6. One mole of N_2H_4 loses 10 mole electrons to from a new compound Y. Assuming that all the N_2 appears in new compound, what is the oxidation state of Nitrogen in Y? (There is no change in the oxidation state of H)

ASSIGNMENTS

Assignment – I

1. Find the oxidation state/number of the following
   (A) Phosphorus in
      (i) H_3PO_4 (ii) PCl_5 (iii) P_2O_5 (vi) $Ca_3(PO_4)_2$
   (B) Chlorine in
      (i) ClF_7 (ii) $Ca(ClO_2)_2$
   (C) Nitrogen in
      (i) N_3H (ii)NCl_5
   (D) Iron in
      (i) Fe_3O_4 (ii) $FeSO_4(NH_4)_2SO_46H_2O$
   (E) Chromium in
      (i) $CrCl_3$ (ii) $KCrO_3Cl$
   (F) Carbon in
      (i) HCH (ii) HNC
   (G) Iodine in
      (i) KI_3 (ii) HI_2O_3 (iii) ICl
      (iv) $ICl^{\cdots\cdots}$ (v) I_2O_4
   (H)Manganese in
      (i) K_2MnO_4 (ii) MnO (iii) $Mn(OH)_3$

Assignment – II

1. Balance the following equating by Ion – electron method by acidic medium.
   (i) $Cd + I_2 + HCl \rightarrow CdCl_2 + HI$
   (ii) $S_2O^{2-}_3 + Sb_2O_5 \rightarrow SbO + H_2SO_3$

(iii) $H_2SO_3 + Cr_2O^{2-}_7 \rightarrow H_2SO_4 + Cr^{3+} + H_2o$

(iv) $N_2SO_3 + BrO^-_3 \rightarrow NO^-_3 + Br^-$

(v) $Au + NO_3^- + Cl^- + H^+ \rightarrow AuCl_4^- + NO_2 + H_2O$

(vi) $I_2 + Cr_2O_7^{2-} + H^+ \rightarrow Cr^{3+} + IO^-_3 + H_2O$

(vii) $Cl_2 + I_2 \rightarrow Cr + IO^-_3$

(viii) $Cu^{2+} + SO_2 \rightarrow SO^{2-}_4 + Cu^+$

(ix) $Cu_2O + H^+ + NO_3^- \rightarrow Cu^{2+} + NO + H_2O.$

2. Balance the following equations using basic medium:

…..

……

….

……..

Gas Laws

1. A gas occupied one litre atmospheric pressure. What will be the change in volume of same amount of gas under 750 mm of Hg at same temperature?

2. A gas 'X' having volume 500 mL at 27^oC, if temperature becomes 127^oC, then find out % Change in volume of gas.

3. A n iron cylinder contains helium at a pressure of 250 KP at 300 K. The cylinder can withstand pressure of 1×10^6 Pa. The room in which cylinder is placed catches fire. Predict whether the cylinder well blow up before it melts or not, melting point of cylinder is k1800 K.

4. Four one liter flasks are separately filed with the gases O_2, F_2, CH_4 CO_2 under the same conditions. What is the ratio of number of molecules in these gases?

Ideal Gas Equation

5. A flask of 2 dm^3 capacity contains O_2 at 101.325 kPa and 300 K. The gas pressure is reduced to 0.1 Pa. Assuming ideal behavior, answer the following :

(i) What will be the volume of the gas which is left behind?

(ii) What amount of O_2 nd the corresponding number of molecules re left behind in the flask?

(iii) If now 2g of N_2 is introduced, what will be the pressure of the flask?

6. When 2 g of gaseous substance A is introduced into an initially evacuated flask kept at 25^oC, the pressure is found to be 1 atm. The flask is evacuated and 3 g of gas B is introduced. The pressure if found to be 0.5 atm at25^oC. Calculate the ratio M_A/M_B(M – Molecular weight).

7. (i) A bulb of unknown volume V contains an ideal gas at 1 atm pressure. This bulb was connected to another evacuated bulb of volume 0.5 L through a stopcock. When stopcock was opened the pressure at each bulb become 530 mm of Hg while the temperature remained constant. Find V in iture.

(ii) The pressure exerted by 12 g of n ideal gas (mol. Wt = 120) at temperature t^oC in a vessel of volume V litre in one atom. When the temperature in increased by 10^oC at the same volume, the pressure increases by 10%. Calculate the temperature and volume V.

8. At an under water depth of 205 ft; the pressure is 8.38 tm. What should be the mole percent of oxygen in the diving gas for the partial pressure of oxygen in the mixture to be 0.21 tm, the same as it is in air at 1atm?

9. A certain mixture of helium and argon weighing 5 g occupies a volume of 10 L at 25°C and 1 tm pressure. What is the composition of the mixture in mass percentage?

PROBLEMS

Subjective

1. 100 m of O_2 is collected over water at 23°C and 800 torr. Compute the standard volume of the dry oxygen. Vapour pressure of water at 23°C is 21.1 torr.
2. A jar contains gas and a few drops of water. The pressure in the jar is 830 mm of Hg. The temperature of the jar is reduced by 1%. The vapour pressure of water at two temperatures are 30 and 25 mm of Hg. Calculate the new pressure in the jar.

3. When 2 g of a gaseous substance A is introduced into an initially evacuated flask at 25°C, the pressure is found to be 1 atm.3 g of another gaseous B is then added to it t the same temperature and pressure. The final pressure is found to be 1.5 atm. Assuming ideal gas behavior, calculate the ratio of the molecular weight of A and B.

4. A mixture of Na_2CO_3 and $NaHCO_3$ has a mass of 22 g. Treatment with excess HCI solution liberates 6L of CO_2 at 25°C and 0.947 atm pressure. Determine the percent Na_2CO_3 in the mixture.

5. A box of 1 capacity is divided into two equal compartments by a thin partition which are filled with 2 g H_2 and 16 g CH_4 respectively. The pressure in compartment filled with H_2 is recorded P atm. What will be the total pressure when partition is removed?

ASSIGNMENTS

ASSIGNMENT – 1

1. What will be the pressure of the gas mixture when 0.5 L of H_2 at 0.8 bar and 2.0 L of oxygen at 0.7 bar are introduced in a 1 L vessel at 27° C?
2. The two bulbs of volume 5 L nd 10 L containing an ideal gas at 9 atm and 6 atm respectively is opened. What is the final pressure in two bulbs if the temperature remains constant?

3. Calculate the temperature of 4.0 moles of a gas occupying 5 dm^3 at 3.32 bar.
($R = 0.083$ bar dm^3K^{-1} mol^{-1}).
4. Calculate the volume occupied by 8.8 g of CO_2 at 31.1°C and 1 bar pressure. $R = 0.083$ bar LK^{-1} mol^{-1}.

5. Density of a gas is found to be 5.46 g/dm^3at 27°C at bar pressure. What will be its density at STP?
6. At STP the density of a gas X is there times that of gas Y while molecular mass of gas Y is twice that of X. What is the ratio of pressure of X and Y?

7. A vessel is 120 ml capacity contains a certain amount of gas at 35°C and 1.2 bar pressure. The gas is transferred to another vessel of volume 180 ml at 35°C. What would be its pressure?
8. What will be the pressure exerted by a mixture of 5.2 g of ethyne and 8.8 g of CO_2 contained in 10 dm^3 flask at 27°C.

9. In two separate bulbs containing ideal gas A nd B respectively, the density of gas A is twice that of gas B while molecular weight of gas A is half that of gas B at the same temperature, pressure ratio P_A/P_B will be…….

10. Under what conditions will a pure sample of an ideal gas not only exhibit a pressure of 1 atm but also concentration of 1 mol / litre

ASSIGNMENT – II

MULTIPLE CHOICE QUESTIONS (SINGLLE OPTION CORRECT)

1. At which of the four conditions, the density of nitrogen will be the largest?
(A) STP (B) 273 K and 2 atm
(C) 546 K and 1 atm (D) 546 K and 2 atm

2. Under identical conditions of temperature, the density of a gas X is there times that of gas Y while molecular mass of gas Y is twice that of X. The ratio of pressure of X and Y will be
(A) 6 (B) 1/6 (C) 2/3 (D) 3/2

3. Four one litre flasks are separately filled with the gases hydrogen helium, oxygen and ozone at the same room temperature and pressure. The ratio of total number of atoms of these gases present in different flasks would be
(A) 1 : 1 :1 : 1 (B) 1 : 2 : 2 : 3 (C) 2 : 1 :2 : 3 (D) 3 : 2 : 2 : 1

4. Volume occupied by molecules of one mole gas at NTP, each having radius of 10^{-8} cm is
(A) 220 litre (B) 22.4 lit (C) 10.09 ml (D) 10.09 lit

5. Under which of the following conditions the density of a gas will remain unchanged?
(A) by doubling both T and P of the gas
(B) by doubling P and reducing T to half
(C) by doubling T but keeping P constant
(D) by reducing P to half and doubling T

6. The temperature of a gas sample is increased from 50 ^{o}C to 100^{o}C. By what factor must the pressure be changed if the volume is to be kept constant?
(A) 0.5 (B) 0.87 (C) 1.15 (D) 2.0

7. When a gas filled in a closed vessel is heated through 1^{o} C its pressure is increased by 0.4%, the initial temperature of the gas was
(A) 250 K (B) 2500 K (C) 250^{o}C (D)25^{o}C

8. 5.40 g of an unknown gasat 27^{o} C occupies the same volume as 0.14 g of hydrogen at 17^{o}C and same pressure. The molecular weight of unknown gas is
(A) 79.8 (B) 81 (C) 79.2

9. A gaseous mixture of 2 moles of A, 3 moles of B, 5moles of C and 10 moles of D is contained in a vessel. Assuming that gases are ideal and the partial pressure of C is 1.5 atm the total pressure is
(A) 3 atm (B) 6 atm (C) 9 atm (D) 15 atm

10 $2NH_4{}^{NO}{}_3(s) \rightarrow 2N_2(g) + 4H_2O(g) + O_2(g)$
How many litres of gas should be formed at 450^{O}C and 1 atm pressure by explosion of 450 g of NH_4NO_3?
(A) 1167.92 L (B) 2000 L (C) 1032 L (D) 1604 L

11. V versus T curve at constant pressure P_1 and P_2 for an ideal gas are shown in Fig. Which is correct? …….

(A) $P_1 > P_2$ (B) $P_1 < P_2$ (C) $P_1 = P_2$ (D) All

12. Under identical conditions of temperature and pressure one litre of CH_4 weight 1.2 while 2 litre of another gaseous hydrocarbon C_nH_{2n-3} weighed 8.1g Value of n will be

(A) 1 (B) 2 (C) 3 (D) 4

13. An open vessel at 27°C is heated until he the 3/5 of the moles of the air in it has been expelled. Assuming that the volume of the vessel remains constant, what is the temperature to which the vessel has been heated.

(A) 27°C (B) 300°C (C) 477°C (D) 110°C

14. 2 L of SO_2 gas at 760 mm Hg are transferred to 10 L flask containing oxygen at a particular temperature, the partial pressure of SO_2 in the flask is

(A) 63.33 mm Hg (B) 152 mm Hg

(C) 760 mm Hg (D) 1330mm Hg

SOME TYPICAL QUESTIONS

1. 5 g of ethane is confined in a bulb of one litre capacity. The bulb is so week that it will burst if the pressure exceeds 10 atm. At what temperature will be the pressure of the gas reach the bursting value?

2. A flask of capacity one litre containing NH_3 at and 25°C. A spark is passed through until all the NH_3 is decomposed into N_2 and H_2 accordion to the reaction $2NH_3 \rightarrow N_2 + 3H_2$ Calculate;

(i) The pressure of gases left at 25°C

(ii) The mole of N_2 and H_2 formed.

3. Two flask of equal volume connected by narrow tube (of negligible volume) are at 27oC and contains 0.7 moles of H2 at 0.5 atm. One of the flask is then immersed in a bath kept at 1270C, while the other remains at 27oC. Calculate the final pressure and the number of moles of H2 in each flask.


TM