1. Which one of the following pairs of compounds illustrates the law of multiple proportions ?
(a) H_2O, Na_2O (b) MgO, Na_2O
(c) Na_2O, BaO (d) $SnCl_2$, $SnCl_4$

2. 2.5 g of a gas occupy the same volume that is occupied by 1 g of O_2 gas under the similar conditions. The gas is :-
(a) CH_4 (b) SO_3
(c) N_2O_4 (d) SO_2

3. How many atom are there in 80 amu of CH_4 ?
(a) $25 \times N_A$ (b) 25
(c) $5/N_A$ (d) 5

4. Calculate percentage of C in $C_6H_{12}O_6$ (Mol.wt =180)
(a) 40%   (b) 46.66%
(c) 38.22%   (d) 53.33%

5. Number of molecules in 4.8 gm O_3 gas :
(a) 6.02×10^{23} (b) 6.02×10^{21}
(c) 60.2×10^{21} (d) 0.602×10^{22}

6. 10 L of H_2 gas reacts with 5 L of O_2 gas the volume of water vapour produced is :
(a) 10 L   (b) 5 L
(c) 20 L   (d) 15 L

7. 100mL of $PH_3(g)$ on decomposition produces P(s) and $H_2(g)$. The change in volume is :
(a) 50 mL increase
(b) 500 mL decrease
(c) 900 mL decrease
(d) 200 mL increase

8. Actual mass of hydrogen molecule is approximately :
(a) 1.66×10^{-24}g   (b) 3.3×10^{-24}g
(c) 2 g   (d) 0.8×10^{-24}g

9. Calculate the weight of lime (CaO) obtained by heating 200 kg of 95% pure limestone ($CaCO_3$) :
(a) 104.4 kg   (b) 105.4 kg
(c) 212.8 kg   (d) 106.4 kg

10. What amount will remain uncreacted after the reaction between 3g carbon and 2g oxygen to produce CO.
(a) 1.5 g C   (b) 0.5 g O_2
(c) 1 g O_2 (d) 0.5 g C

11. A compound contains equal mass % of element A, B and C. If atomic masses of A, B and C are 20, 40 and 60 respectively, the empirical formula of compound is :
(a) A_3B_2C (b) AB_2C_3
(c) ABC (d) $A_6B_3C_2$

12. Weight of gas of NH_3 present in a flask if number of molecules of NH_3 gas are 3.01×10^{23} :
(a) 17 gm   (b) 9.5 gm
(c) 8.5 gm   (d) 34 gm

13. 0.3 L of a gaseous hydrocarbon burns with O_2 to produce 1.2 L $CO_{2(g)}$ and 1.5 L $H_2O_{(g)}$. Hydrocarbon is :
(a) C_2H_6 (b) C_2H_4
(c) C_3H_8 (d) $C4H_{10}$

14. For a reaction $2A + 3B \rightarrow 2C$. The amount of C formed by starting the reaction with 4 moles of A and 12 moles of B is :

(a) 8 mol   (b) 4 mol

(c) 2 mol   (d) 1 mol

15. A reaction occur between 6 moles of H_2 and 1.5 moles of O_2 to give some amount of H_2O. The limiting reagent in this reaction will be. $2H_2 + O_2 \rightarrow 2H_2O$

(a) H_2 and O_2 both

(b) O_2

(c) H_2

(d) Neither of them

16. Boron has two stable isotopes, $^{10}B(19\%)$ and ^{11}B (81%). The atomic mass that should appear for boron in the periodic table is :

(a) 10.8   (b) 10.2

(c) 11.2   (d) 10.0

17. A sample of pure carbon dioxide, irrespective of its source contains 27.27% carbon and 72.73% oxygen. The data support :

(a) Law of constant composition

(b) Law of conservation of mass

(c) Law of reciprocal proportions

(d) Law of multiple proportions

18. The number of moles of oxygen in 1 L of air containing 21% oxygen by volume, in standard conditions, is :

(a) 0.186 moles   (b) 0.21 mole

(c) 2.10 mole   (d) 0.0093 mole

19. Haemoglobin contains 0.33% of iron by mass. The molecular mass of haemoglobin is approximately 67200. The number of iron atoms (At. Mass of Fe = 56) present in one molecule of haemoglobin is :

(a) 6   (b) 1

(c) 4   (d) 2

20. If 0.30 mole of $CaCl_2$ is mixed with 0.20 mole of Na_3PO_4, the maximum number of moles of $Ca_3(PO_4)_2$ which can be formed, is :

(a) 0.70   (b) 0.50

(c) 0.20   (d) 0.10

21. The number of atoms in 4.25 g of NH_3 is approximately :

(a) 1×10^{23} (b) 2×10^{23}

(c) 4×10^{23} (d) 6×10^{23}

22. The mass of a molecule of the compound $C_{60}H_{122}$ is :

(a) $1.4\times10^{-21}g$ (b) $1.09\times10^{-21}g$

(c) $5.025\times10^{23}g$ (d) $16.023\times10^{23}g$

23. The modern atomic mass scale is based on :

(a) C^{12} (b) O^{16}

(c) H^{1} (d) C^{13}

24. How many moles of lead (II) chloride will be formed from a reaction between 6.5 g of PbO and 3.2 of HCl ?

(a) 0.011   (b) 0.029

(c) 0.044   (d) 0.333

25. Which has the maximum number of molecules among the following ?

(a) 44 g CO_2 (b) 48 g O_3

(c) 8 g H_2 (d) 64 g SO_2

26. Acidified $K_2Cr_2O_7$ solution turns green when Na_2SO_3 is added to it. This is due to the formation of :

(a) $Cr_2(SO_4)_3$ (b) CrO_4^{2-}

(c) $Cr_2(SO_3)_3$ (d) $CrSO_4$

27. The total number of electrons in 18 mL of water (density = 1g mL^{-1}) is :

(a) 6.02×10^{23} (b) 6.02×10^{25}

(c) 6.02×10^{24} (d) 6.02×18^{23}

28. Avogadro number (6.023×10^{23}) of carbon atoms are present in :

(a) 12 grams of $^{12}CO_2$

(b) 22.4 litre $^{12}CO_2$ in room temperature

(c) 44 grams of $^{12}CO_2$

(d) 12 moles of $^{12}CO_2$

29. When 22.4 litres of $H_2(g)$ is mixed with 11.2 litres of $Cl_2(g)$. each at STP, the moles of HCl(g) formed is equal to :

(a) 0.5 mol of HCl(g)

(b) 1.5 mole of HCl(g)

(c) 1 mol of HCl(g)

(d) 2 mol of HCl(g)

30. Which one of the following has maximum number of molecule ?

(a) 16 g of O_2 (b) 16 g of NO_2

(c) 4 g of N_2 (d) 32 g of N_2

31. The number of moles of hydrogen molecules required to produce 20 moles ammonia through Haber's process is :

(a) 10 (b) 20

(c) 30 (d) 40

32. The equivalent mass of $MnSO_4$ is half its molecular mass when it is converted to :

(a) Mn_2O_3 (b) MnO_2

(c) MnO_4 (d) MnO_4^{2-}

33. The oxide which cannot act as a reducing agent is :

(a) SO_2 (b) NO_2

(c) CO_2 (d) ClO_2

34. What is the average oxidation number of sulphur in $Na_2S_4O_6$?

(a) $\frac{2}{3}$ (b) $\frac{3}{2}$

(c) $\frac{3}{5}$ (d) $\frac{5}{2}$

35. Oxidation state of Fe in Fe_3O_4 is :

(a) $\frac{3}{2}$ (b) $\frac{4}{5}$

(c) $\frac{5}{4}$ (d) $\frac{8}{3}$

36. A compound contains atoms of three elements in A, B and C. If the oxidation number of A is +2, B is +5 and that of C is –2, the possible formula of the compound is :

(a) $A_3(BC_4)_2$ (b) $A_3(B_4C)_2$

(c) ABC_2 (d) $A_2(BC_3)_2$

37. The valency of Cr in the complex $[Cr(H_2O)_4Cl_2]+$ is :

(a) 1 (b) 3

(c) 5 (d) 6

38. Which of the following reactions involves oxidation reduction ?

(a) $NaBr + HCl \rightarrow NaCl + HBr$

(b) $HBr + AgNO_3 \rightarrow AgBr + HNO_3$

(c) $H_2 + Br_2 \rightarrow 2HBr$

(d) $2NaOH + H_2SO_4 \rightarrow Na_2SO_4 + 2H_2O$

39. If HNO_3 changes into N_2O, the oxidation number is changed by :

(a) +2 (b) –1

(c) 0 (d) +4

40. Oxidation number of oxygen in ozone (O_3) is :

(a) +3 (b) –3

(c) –2 (d) 0

41. In the conversion $Br_2 \rightarrow BrO_3^-$, the oxidation state of bromine changes from :

(a) –1 to –1 (b) 0 to –1

(c) 0 to +5 (d) 0 to –5

42. The number of moles of $KMnO_4$ reduced by one mole of KI in alkaline medium is :

(a) one fifth (b) five

(c) one (d) two

43. Oxidation number of nitrogen in $NaNO_2$ is :

(a) +2 (b) +3

(c) +4 (d) –3

44. The number of moles of $KMnO_4$ that will be needed to react with one mole of sulphide ion in acidic solution is :

(a) $\frac{3}{5}$ (b) $\frac{4}{5}$

(c) $\frac{2}{5}$ (d) 1

45. The oxidation states of iodine in HIO_4, H_3IO_5 and H_5IO_6 are, respectively :

(a) +1, +3, 7 (b) +7, +7, +3

(c) +7, +7, +7 (d) +7, +5, +3

46. Number of moles of MnO_4^- required to oxidize one mole of ferrous oxalate completely in acidic medium will be :
(a) 7.5 moles   (b) 0.2 mole
(c) 0.6 mole   (d) 0.4 mole

47. 100 mL of PH_3 on decomposition produced phosphorus and hydrogen. The change in volume is :
(a) 50 mL increase
(b) 500 mL decrease
(c) 900 mL decrease
(d) nil

48. During the conversion of $NH_2OH \rightarrow N_2O$, the equivalent mass of NH_2OH is : (mol. Mass of NH_2OH is M)
(a) M   (b) M/2
(c) M/4   (d) M/5

49. The oxidation state of phosphorous in cyclo-trimetaphosphoric acid is :
(a) +3   (b) +5
(c) –3   (d) +2

50. 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