

Exercise - I (Conceptual Questions)

Build Up Your Understanding

QUESTIONS BASED ON MOLES

1. The number of atoms present in 16 g of oxygen is
 (1) $6.02 \times 10^{11.5}$ (2) 3.01×10^{23}
 (3) $3.01 \times 10^{11.5}$ (4) 6.02×10^{23}

CMC001

2. The number of atoms in 4.25 g of NH_3 is approx:-
 (1) 1×10^{23} (2) 1.5×10^{23}
 (3) 2×10^{23} (4) 6×10^{23}

CMC002

3. Which of the following contains maximum number of oxygen atoms?
 (1) 1 g of O
 (2) 1 g of O_2
 (3) 1 g of O_3
 (4) all have the same number of atoms

CMC003

4. The number of atoms present in 0.5 g atom of nitrogen is same as the atoms in -
 (1) 12 g of C (2) 32 g of S
 (3) 8 g of oxygen (4) 24 g of Mg

CMC004

5. Which of the following contains maximum number of atoms?
 (1) 4 g of H_2 (2) 16 g of O_2
 (3) 28 g of N_2 (4) 18 g of H_2O

CMC005

6. Number of neutrons present in 1.7 g of ammonia is -
 (1) N_A (2) $N_A/10 \times 4$
 (3) $(N_A/10) \times 7$ (4) $N_A \times 10 \times 7$

CMC006

7. 5.6 L of oxygen at STP contains -
 (1) 6.02×10^{23} atoms
 (2) 3.01×10^{23} atoms
 (3) 1.505×10^{23} atoms
 (4) 0.7525×10^{23} atoms

CMC007

8. Number of oxygen atoms in 8 g of ozone is -
 (1) 6.02×10^{23} (2) $\frac{6.02 \times 10^{23}}{2}$
 (3) $\frac{6.02 \times 10^{23}}{3}$ (4) $\frac{6.02 \times 10^{23}}{6}$

CMC008

9. Sum of number of protons, electrons and neutrons in 12g of $^{12}_6\text{C}$ is :-

(1) 1.8 (2) 12.044×10^{23}
 (3) 1.084×10^{25} (4) 10.84×10^{23}

CMC009

10. The weight of one atom of Uranium is 238 amu. Its actual weight is g.

(1) 1.43×10^{26} (2) 3.94×10^{-22}
 (3) 6.99×10^{-23} (4) 1.53×10^{-22}

CMC010

11. The actual weight of a molecule of water is -

(1) 18 g
 (2) 2.99×10^{-23} g
 (3) both (1) & (2) are correct
 (4) 1.66×10^{-24} g

CMC011

12. What is the mass of a molecule of CH_4 :-

(1) 16 g (2) 26.6×10^{22} g
 (3) 2.66×10^{-23} g (4) $16 N_A$ g

CMC012

13. Which of the following has the highest mass?

(1) 1 g atom of C
 (2) 1/2 mole of CH_4
 (3) 10 mL of water
 (4) 3.011×10^{23} atoms of oxygen

CMC013

14. Which of the following contains the least number of molecules?

(1) 4.4 g CO_2 (2) 3.4 g NH_3
 (3) 1.6 g CH_4 (4) 3.2 g SO_2

CMC014

15. The number of molecule in 4.25 g of NH_3 is -

(1) 1.505×10^{23} (2) 3.01×10^{23}
 (3) 6.02×10^{23} (4) None of these

CMC015

16. Elements A and B form two compounds B_2A_3 and B_2A . 0.05 moles of B_2A_3 weight 9.0 g and 0.10 mole of B_2A weight 10 g. Calculate the atomic weight of A and B :-

(1) 20 and 30 (2) 30 and 40
 (3) 40 and 30 (4) 30 and 20

CMC016

17. 5.6 L of oxygen at NTP is equivalent to –

- (1) 1 mol (2) 1/2 mol
(3) 1/4 mol (4) 1/8 mol

CMC017

18. 4.4 g of an unknown gas occupies 2.24 L of volume at STP. The gas may be :-

- (1) N₂O (2) CO
(3) CO₂ (4) 1 & 3 both

CMC018

19. Which contains least number of molecules :-

- (1) 1 g CO₂ (2) 1 g N₂
(3) 1 g O₂ (4) 1 g H₂

CMC019

20. If V mL of the vapours of substance at NTP weight W g. Then molecular weight of substance is:-

- (1) $(W/V) \times 22400$ (2) $\frac{V}{W} \times 22.4$
(3) $(W - V) \times 22400$ (4) $\frac{W \times 1}{V \times 22400}$

CMC020

21. If 3.01×10^{20} molecules are removed from 98 mg of H₂SO₄, then the number of moles of H₂SO₄ left are :-

- (1) 0.1×10^{-3} (2) 0.5×10^{-3}
(3) 1.66×10^{-3} (4) 9.95×10^{-2}

CMC021

22. A gas is found to have the formula (CO)_x. It's VD is 70. The value of x must be:-

- (1) 7 (2) 4 (3) 5 (4) 6

CMC022

23. Vapour density of gas is 11.2. Volume occupied by 2.4 g of this at STP will be -

- (1) 11.2 L (2) 2.24 L (3) 22.4 L (4) 2.4 L

CMC023

24. The volume of a gas in discharge tube is 1.12×10^{-7} mL at STP. Then the number of molecule of gas in the tube is -

- (1) 3.01×10^4 (2) 3.01×10^{15}
(3) 3.01×10^{12} (4) 3.01×10^{16}

CMC024

25. The number of electron in 3.1 mg NO₃⁻ is

(N_A = 6×10^{23})

- (1) 32 (2) 1.6×10^{-3}
(3) 9.6×10^{20} (4) 9.6×10^{23}

CMC025

26. Given that one mole of N₂ at NTP occupies 22.4 L the density of N₂ is -

- (1) 1.25 g L⁻¹ (2) 0.80 g L⁻¹
(3) 2.5 g L⁻¹ (4) 1.60 g L⁻¹

CMC026

27. The number of carbon atoms present in a signature, if a signature written by carbon pencil, weighing 1.2×10^{-3} g is

- (1) 12.04×10^{20} (2) 6.02×10^{19}
(3) 3.01×10^{19} (4) 6.02×10^{20}

CMC027

QUESTIONS BASED ON PERCENTAGE, EMPIRICAL FORMULA & MOLECULAR FORMULA

28. A compound of X and Y has equal mass of them. If their atomic weights are 30 and 20 respectively. Molecular formula of the compound is :-

- (1) X₂Y₂ (2) X₃Y₃ (3) X₂Y₃ (4) X₃Y₂

CMC028

29. An oxide of sulphur contains 50% of sulphur in it. Its empirical formula is -

- (1) SO₂ (2) SO₃ (3) SO (4) S₂O

CMC029

30. A hydrocarbon contains 80% of carbon, then the hydrocarbon is -

- (1) CH₄ (2) C₂H₄ (3) C₂H₆ (4) C₂H₂

CMC030

31. Empirical formula of glucose is -

- (1) C₆H₁₂O₆ (2) C₃H₆O₃ (3) C₂H₄O₂ (4) CH₂O

CMC031

32. An oxide of metal M has 40% by mass of oxygen. Metal M has atomic mass of 24. The empirical formula of the oxide is :-

- (1) M₂O (2) M₂O₃ (3) MO (4) M₃O₄

CMC032

33. A compound contains 38.8% C, 16.0% H and 45.2% N. The formula of the compound would be

- (1) CH_3NH_2 (2) CH_3CN
(3) $\text{C}_2\text{H}_5\text{CN}$ (4) $\text{CH}_2(\text{NH})_2$

CMC033

34. The simplest formula of a compound containing 50%(w/w) of element X(at wt. = 10) and 50% of element Y(at wt. = 20) is:-

- (1) XY (2) X_2Y (3) XY_2 (4) X_3Y

CMC034

35. Which of the following compound has same empirical formula as that of glucose:-

- (1) CH_3CHO (2) CH_3COOH
(3) CH_3OH (4) C_2H_6

CMC035

36. 2.2 g of a compound of phosphorous and sulphur has 1.24 g of 'P' in it. Its empirical formula is -

- (1) P_2S_3 (2) P_3S_2 (3) P_3S_4 (4) P_4S_3

CMC036

37. On analysis, a certain compound was found to contain iodine and oxygen in the mass ratio of 254:80. The formula of the compound is :

(At mass I = 127, O = 16)

- (1) IO (2) I_2O (3) I_5O_2 (4) I_2O_5

CMC037

38. The number of atoms of Cr and O are 4.8×10^{10} and 9.6×10^{10} respectively. Its empirical formula is -

- (1) Cr_2O_3 (2) CrO_2 (3) Cr_2O_4 (4) CrO_5

CMC038

39. Insulin contains 3.4% sulphur by mass. The minimum molecular weight of insulin is :

- (1) 941.176 (2) 944 (3) 945.27 (4) None

CMC039

40. Caffeine has a molecular weight of 194. It contains 28.9% by mass of nitrogen. Number of atoms of nitrogen in one molecule of it is :-

- (1) 2 (2) 3 (3) 4 (4) 5

CMC040

QUESTIONS BASED ON STOICHIOMETRY

41. An organic compound contains carbon, hydrogen and oxygen. Its elemental analysis gives 38.71% of C and 9.67% of H. The empirical formula of the compound would be :-

- (1) CHO (2) CH_4O (3) CH_3O (4) CH_2O

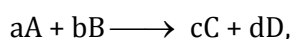
CMC041

42. The amount of water (g) produced by combustion of 286 g of propane is

- (1) 168 g (2) 200 g (3) 468 g (4) 693 g

CMC042

43. In a gaseous reaction of the type



which statement is wrong ?

- (1) A litre of A combines with b litre of B to give C and D
(2) A mole of A combines with b moles of B to give C and D
(3) A g of A combines with b g of B to give C and D
(4) A molecules of A combines with b molecules of B to give C and D

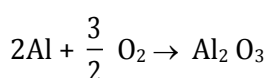
CMC043

44. Assuming that petrol is octane (C_8H_{18}) and has density 0.8 g mL^{-1} . 1.425 L of petrol on complete combustion will consume.

- (1) 50 mole of O_2 (2) 100 mole of O_2
(3) 125 mole of O_2 (4) 200 mole of O_2

CMC044

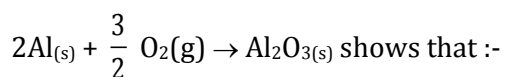
45. In a given reaction, 9 g of Al will react with



- (1) 6 g O_2 (2) 8 g O_2 (3) 9 g O_2 (4) 4 g O_2

CMC045

46. The equation :



(1) 2 mol of Al reacts with $\frac{3}{2}$ mol of O_2 to

produce $\frac{7}{2}$ mol of Al_2O_3

(2) 2 g of Al reacts with $\frac{3}{2}$ g of O_2 to produce

one mol of Al_2O_3

(3) 2 g of Al reacts with $\frac{3}{2}$ L of O_2 to produce

1 mol of Al_2O_3

(4) 2 mol of Al reacts with $\frac{3}{2}$ mol of O_2 to

produce 1 mol of Al_2O_3

CMC046

47. 1 L of CO_2 is passed over hot coke. When the volume of reaction mixture becomes 1.4 L, the composition of reaction mixture is-

(1) 0.6 L CO

(2) 0.8 L CO_2

(3) 0.6 L CO_2 and 0.8 L CO

(4) None

CMC047

48. 26 cc of CO_2 are passed over red hot coke. The volume of CO evolved is :-

(1) 15 cc (2) 10 cc (3) 32 cc (4) 52 cc

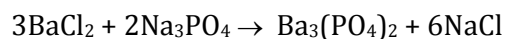
CMC048

49. If $\frac{1}{2}$ mol of oxygen combine with Aluminium to form Al_2O_3 then weight of Aluminium metal used in the reaction is (Al=27) -

(1) 27 g (2) 18 g (3) 54 g (4) 40.5 g

CMC049

50. If 0.5 mol of BaCl_2 is mixed with 0.2 mol of Na_3PO_4 , the maximum number of moles of $\text{Ba}_3(\text{PO}_4)_2$ that can be formed is -



(1) 0.7 (2) 0.5 (3) 0.3 (4) 0.1

CMC050

51. If 8 mL of uncombined O_2 remain after exploding O_2 with 4 mL of hydrogen, the number of mL of O_2 originally were -

(1) 12 (2) 2 (3) 10 (4) 4

CMC051

52. 4 g of hydrogen are ignited with 4 g of oxygen. The weight of water formed is -

(1) 0.5 g (2) 3.5 g (3) 4.5 g (4) 2.5 g

CMC052

53. For the reaction $\text{A} + 2\text{B} \longrightarrow \text{C}$,

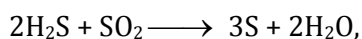
5 mol of A and 8 mol of B will produce

(1) 5 mole of C (2) 4 mole of C

(3) 8 mole of C (4) 13 mole of C

CMC053

54. If 1.6 g of SO_2 and 1.5×10^{22} molecules of H_2S are mixed and allowed to remain in contact in a closed vessel until the reaction



proceeds to completion. Which of the following statement is true ?

(1) Only 'S' and ' H_2O ' remain in the reaction vessel.

(2) ' H_2S ' will remain in excess

(3) ' SO_2 ' will remain in excess

(4) None

CMC054

55. 12 L of H_2 and 11.2 L of Cl_2 are mixed and exploded. The composition by volume of mixture is-

(1) 24 L of HCl (g)

(2) 0.8 L Cl_2 and 20.8 L HCl (g)

(3) 0.8 L H_2 and 22.4 L HCl (g)

(4) 22.4 L HCl (g)

CMC055

56. 10 mL of gaseous hydrocarbon on combustion give 40 mL of $\text{CO}_2(\text{g})$ and 50 mL of H_2O (vap.). The hydrocarbon is -

(1) C_4H_5 (2) C_8H_{10} (3) C_4H_8 (4) C_4H_{10}

CMC056

**QUESTIONS BASED ON LAWS OF
CHEMICAL COMBINATION**

57. The law of multiple proportion was proposed by :

- (1) Lavoisier (2) Dalton
(3) Proust (4) Gaylussac

CMC101

58. Which one of the following pairs of compound illustrate the law of multiple proportions ?

- (1) H_2O , Na_2O
(2) MgO , Na_2O
(3) Na_2O , BaO
(4) SnCl_2 , SnCl_4

CMC102

59. In the reaction

$\text{N}_2 + 3\text{H}_2 \longrightarrow 2\text{NH}_3$, ratio by volume of N_2 , H_2 and NH_3 is 1 : 3 : 2. This illustrates law of -

- (1) Definite proportion
(2) Multiple proportion
(3) Law of conservation of mass
(4) Gaseous volumes

CMC103

60. Different proportions of oxygen in the various oxides of nitrogen prove the law of -

- (1) Equivalent proportion
(2) Multiple proportion
(3) Constant proportion
(4) Conservation of matter

CMC104

61. The law of conservation of mass holds good for all of the following except -

- (1) All chemical reactions
(2) Nuclear reactions
(3) Endothermic reactions
(4) Exothermic reactions

CMC106

62. Number of molecules in 100 mL of each of O_2 , NH_3 and CO_2 at STP are -

- (1) In the order $\text{CO}_2 < \text{O}_2 < \text{NH}_3$
(2) In the order $\text{NH}_3 < \text{O}_2 < \text{CO}_2$
(3) The same
(4) $\text{NH}_3 = \text{CO}_2 < \text{O}_2$

CMC107

63. The empirical formula of an organic compound containing carbon and hydrogen is CH_2 . The mass of one litre of this organic gas is exactly equal to that of one litre of N_2 at same temperature and pressure. Therefore, the molecular formula of the organic gas is -

- (1) C_2H_4 (2) C_3H_6 (3) C_6H_{12} (4) C_4H_8

CMC108

64. Four one litre flasks are separately filled with the gases hydrogen, helium, oxygen and ozone at same room temperature and pressure. The ratio of total number of atoms of these gases present in the different flasks would be -

- (1) 1 : 1 : 1 : 1 (2) 1 : 2 : 2 : 3
(3) 2 : 1 : 2 : 3 (4) 2 : 1 : 3 : 2

CMC109

65. A container of volume V, contains 0.28 g of N_2 gas. If same volume of an unknown gas under similar condition of temperature and pressure weighs 0.44 g, the molecular mass of the gas is

- (1) 22 (2) 44 (3) 66 (4) 88

CMC110

66. When 100 g of ethylene polymerizes to polyethylene according to equation $n\text{CH}_2 = \text{CH}_2 \rightarrow -(\text{CH}_2 - \text{CH}_2)_n-$. The weight of polyethylene produced will be:-

- (1) $\frac{n}{2}$ g (2) 100 g
(3) $\frac{100}{n}$ g (4) 100 ng

CMC111

67. A chemical equation is balanced according to the law of –

- (1) Multiple proportion
- (2) Constant composition
- (3) Gaseous volume
- (4) Conservation of mass

CMC112

68. Two flasks A & B of equal capacity of volume contain NH_3 and SO_2 gas respectively under similar conditions. Which flask has more number of moles:-

- (1) A
- (2) B
- (3) Both have same moles
- (4) None

CMC113

EXERCISE-I (Conceptual Questions)

ANSWER KEY

Question	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Answer	4	4	4	3	1	3	2	2	3	2	2	3	1	4	1
Question	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Answer	3	3	4	1	1	2	3	4	3	3	1	2	3	1	3
Question	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
Answer	4	3	1	2	2	4	4	2	1	3	3	3	3	3	2
Question	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
Answer	4	3	4	2	4	3	3	2	3	3	4	2	4	4	2
Question	61	62	63	64	65	66	67	68							
Answer	2	3	1	3	2	2	4	3							

Exercise - II (Previous Year Questions)

AIPMT/NEET

AIPMT 2014

1. Equal masses of H_2O_2 and methane have been taken in a container of volume V at temperature $27^\circ C$ at identical conditions. The ratio of the volumes of gases $H_2 : O_2 : CH_4$ would be :
 (1) 8 : 16 : 1 (2) 16 : 8 : 1
 (3) 16 : 1 : 2 (4) 8 : 1 : 2

CMC118

2. When 22.4 L of $H_2(g)$ is mixed with 11.2 L of $Cl_2(g)$ at S.T.P., the moles of $HCl(g)$ formed is equal to:-
 (1) 1 mol of $HCl(g)$ (2) 2 mol of $HCl(g)$
 (3) 0.5 mol of $HCl(g)$ (4) 1.5 mol of $HCl(g)$

CMC119

3. 1.0 g of magnesium is burnt with 0.56 g O_2 in a closed vessel. Which reactant is left in excess and by how much ?
 (At. wt. $Mg = 24$; $O = 16$)
 (1) Mg , 0.16 g (2) O_2 , 0.16 g
 (3) Mg , 0.44 g (4) O_2 , 0.28 g

CMC120

AIPMT 2015

4. A mixture of gases contains H_2 and O_2 gases in the ratio of 1 : 4 (w/w). What is the molar ratio of the two gases in the mixture ?
 (1) 4 : 1 (2) 16 : 1 (3) 2 : 1 (4) 1 : 4

CMC121

Re-AIPMT 2015

5. The number of water molecules is maximum in-
 (1) 18 g of water
 (2) 18 mol of water
 (3) 18 molecules of water
 (4) 1.8 g of water

CMC122

6. If avogadro number N_A , is changed from $6.022 \times 10^{23} \text{ mol}^{-1}$ to $6.022 \times 10^{20} \text{ mol}^{-1}$, this would change :
 (1) The ratio of chemical species to each other in a balanced equation
 (2) The ratio of elements to each other in a compound
 (3) The definition of mass in units of grams
 (4) The mass of one mole of carbon

CMC123

7. 20.0 g of a magnesium carbonate sample decomposes on heating to give carbon dioxide and 8.0 g magnesium oxide. What will be the percentage purity of magnesium carbonate in the sample ? (Atomic weight of $Mg = 24$)
 (1) 60 (2) 84 (3) 75 (4) 96

CMC124

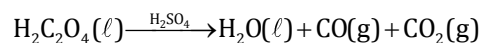
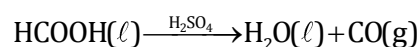
NEET-II 2016

8. Suppose the elements X and Y combine to form two compounds XY_2 and X_3Y_2 . When 0.1 mole of XY_2 weighs 10 g and 0.05 mole of X_3Y_2 weighs 9 g, the atomic weights of X and Y are
 (1) 20, 30 (2) 30, 20 (3) 40, 30 (4) 60, 40

CMC125

NEET(UG) 2018

9. A mixture of 2.3 g formic acid and 4.5 g oxalic acid is treated with conc. H_2SO_4 . The evolved gaseous mixture is passed through KOH pellets. Weight (in g) of the remaining product at STP will be



- (1) 1.4 (2) 3.0 (3) 2.8 (4) 4.4

CMC126

10. In which case is the number of molecules of water maximum?

- (1) 18 mL of water
 (2) 0.18 g of water
 (3) 0.00224 L of water vapours at 1 atm and 273K
 (4) 10^{-3} mol of water

CMC127

NEET (UG) 2019

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

- (1) 10 (2) 20 (3) 30 (4) 40

CMC128

NEET (UG) (Odisha) 2019

12. The volume occupied by 1.8 g of water vapour at $374^\circ C$ and 1 bar pressure will be :-

[Use $R = 0.083 \text{ bar L K}^{-1} \text{ mol}^{-1}$]

- (1) 96.66 L (2) 55.87 L (3) 3.10 L (4) 5.37 L

CMC129

Some Basic Concepts of Chemistry-Mole Concept

NEET (UG) 2020

13. Which one of the following has maximum number of atoms?

- (1) 1g of Li(s) [Atomic mass of Li = 7]
(2) 1g of Ag(s) [Atomic mass of Ag = 108]
(3) 1g of Mg(s) [Atomic mass of Mg = 24]
(4) 1g of O₂(g) [Atomic mass of O = 16]

CMC130

NEET (UG) 2020 (Covid-19)

14. One mole of carbon atom weighs 12 g, the number of atoms in it is equal to,

- (Mass of carbon – 12 is 1.9926×10^{-23} g)
(1) 1.2×10^{23} (2) 6.022×10^{22}
(3) 12×10^{22} (4) 6.022×10^{23}

CMC131

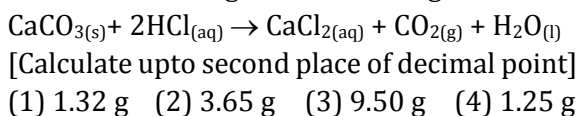
NEET (UG) 2021

15. An organic compound contains 78% (by wt.) carbon and remaining percentage of hydrogen. The right option for the empirical formula of this compound is [Atomic wt. of C is 12, H is 1]
(1) CH (2) CH₂ (3) CH₃ (4) CH₄

CMC132

NEET (UG) 2022

16. What mass of 95% pure CaCO₃ will be required to neutralise 50 mL of 0.5 M HCl solution according to the following reaction ?



CMC133

17. The density of the solution is 2.15 g mL⁻¹, then mass of 2.5 mL solution in correct significant figures is

- (1) 5375×10^{-3} g (2) 5.4 g
(3) 5.38 g (4) 53.75 g

CMC134

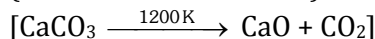
18. What fraction of Fe exists as Fe(III) in Fe_{0.96} O? (Consider Fe_{0.96} to be made up of Fe(II) and Fe(III) only)

- (1) $\frac{1}{12}$ (2) 0.08 (3) $\frac{1}{16}$ (4) $\frac{1}{20}$

CMC135

NEET (UG) 2023

19. The **right** option for the mass of CO₂ produced by heating 20 g of 20% pure limestone is (Atomic mass of Ca = 40)



- (1) 1.76 g (2) 2.64 g (3) 1.32 g (4) 1.12 g

CMC151

NEET (UG) 2024

20. The highest number of helium atoms is in :

- (1) 4 mol of helium
(2) 4 u of helium
(3) 4 g of helium
(4) 2.271098 L of helium at STP

CMC169

21. 1 gram of sodium hydroxide was treated with 25 mL of 0.75 M HCL solution, the mass of sodium hydroxide left unreacted is equal to
(1) 750mg (2) 250mg (3) Zero mg (4) 200mg

CMC170

22. A compound X contains 32% of A, 20% of B and remaining percentage of C. Then, the empirical formula of X is :

(Given atomic masses of A = 64; B = 40; C = 32 u)

- (1) A₂BC₂ (2) ABC₃ (3) AB₂C₂ (4) ABC₄

CMC171

NEET (UG) 2024 (Re-examination)

23. 1.0 g of H₂ has same number of molecules as in
(1) 14 g of N₂ (2) 18 g of H₂O
(3) 16 g of CO (4) 28 g of N₂

CMC172

24. On complete combustion, 0.3 g of an organic compound gave 0.2 g of CO₂ and 0.1 g of H₂O. The percentage composition of carbon and hydrogen in the compound, respectively is :

- (1) 4.07 % and 15.02% (2) 18.18% and 3.70%
(3) 15.02% and 4.07% (4) 3.70% and 18.18%

CMC173

EXERCISE-II (Previous Year Questions)

ANSWER KEY

Question	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Answer	3	1	1	1	2	4	2	3	3	1	3	4	1	4	3
Question	16	17	18	19	20	21	22	23	24						
Answer	1	2	1	1	1	2	2	1	2						

Exercise – III (Analytical Questions)

Master Your Understanding

1. Given below are two statements:

Statement-I : A molecule of butane, C_4H_{10} has a mass of 58 amu.

Statement-II : One mole of butane contains 6.022×10^{23} molecules and has a mass of 58g. In the light of the above statements, choose the most appropriate answer from the options given below:

- (1) Statement-I is correct while II is incorrect.
- (2) Statement-I and II both are correct.
- (3) Both Statement-I and II are incorrect.
- (4) Statement-I is incorrect and II is correct.

CMC137

2. Given below are two statements:

Statement-I : Both 12g of carbon and 27g of Aluminium will have 6.02×10^{23} atoms.

Statement-II : Gram atomic mass of an element contains Avogadro's no. of atoms.

In the light of the above statements, choose the most appropriate answer from the options given below:

- (1) Statement-I and II both are correct.
- (2) Statement-I is correct while II is incorrect.
- (3) Both Statement-I and II are incorrect.
- (4) Statement-I is incorrect and II is correct.

CMC138

3. Given below are two statements:

Statement-I : $2A + 3B \rightarrow C$

$\frac{4}{3}$ moles of 'C' are produced when 3 moles of 'A' and 4 moles of 'B' are added.

Statement-II : 'A' is limiting reagent for the given data.

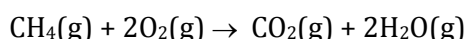
In the light of the above statements, choose the most appropriate answer from the options given below:

- (1) Statement-I and II both are correct.
- (2) Statement-I is correct while II is incorrect.
- (3) Both Statement-I and II are incorrect.
- (4) Statement-I is incorrect and II is correct.

CMC139

4. Given below are two statements:

Statement-I : In the reaction



One mole of $CH_4(g)$ reacts with two moles of $O_2(g)$ to give one mole of $CO_2(g)$ and two moles of $H_2O(g)$.

Statement-II : 1g of $CH_4(g)$ reacts with 2g of $O_2(g)$ to give 1g of $CO_2(g)$ and 2g of $H_2O(g)$.

In the light of the above statements, choose the most appropriate answer from the options given below:

- (1) Statement-I and II both are correct.
- (2) Statement-I is correct while II is incorrect.
- (3) Both Statement-I and II are incorrect.
- (4) Statement-I is incorrect and II is correct.

CMC140

5. Given below are two statements:

Statement-I : For a reaction between 10L $H_2(g)$ and 10L $O_2(g)$, only 10L of liquid water is obtained, under the same conditions of P & T.

Statement-II : When gases combine or are produced in a chemical reaction they do so in a simple ratio by volume as their stoichiometric coefficients, provided that all gases are present under the same conditions of pressure & temperature.

In the light of the above statements, choose the most appropriate answer from the options given below:

- (1) Statement-I and II both are correct.
- (2) Statement-I is correct while II is incorrect.
- (3) Both Statement-I and II are incorrect.
- (4) Statement-I is incorrect and II is correct.

CMC141

6. Given below are two statements; one is labelled as **Assertion (A)** and the other is labelled as **Reason(R)**.

Assertion (A) : Hydrogen combines with oxygen to form two compounds namely, water and hydrogen peroxide.

Reason (R) : The above example is in accordance with law of multiple proportion.

In the light of the assertion reason statements, choose the **most appropriate** answer from the options given below :

- (1) If (A) & (R) both are correct and (R) is the correct explanation of (A).
- (2) If (A) & (R) both are correct but (R) is not the correct explanation of (A).
- (3) (A) is correct but (R) is incorrect.
- (4) (A) & (R) both are incorrect.

CMC142

7. Given below are two statements; one is labelled as **Assertion (A)** and the other is labelled as **Reason(R)**.

Assertion (A) : The average mass of one C atom is 12.011 amu, which is not the actual mass of one C atom.

Reason (R) : Three isotopes ^{12}C , ^{13}C and ^{14}C , of C are found in nature.

In the light of the above statements, choose the **most appropriate** answer from the options given below :

- (1) If (A) & (R) both are correct and (R) is the correct explanation of (A).
- (2) If (A) & (R) both are correct but (R) is not the correct explanation of (A).
- (3) (A) is correct but (R) is incorrect.
- (4) (A) & (R) both are incorrect.

CMC143

8. Given below are two statements; one is labelled as **Assertion (A)** and the other is labelled as **Reason(R)**.

Assertion (A) : Equal volume of all gases contains equal no. of atoms, under same conditions of P and T.

Reason (R) : Atom is the fundamental entity which takes part in chemical reactions.

In the light of the above statements, choose the **most appropriate** answer from the options given below :

- (1) If (A) & (R) both are correct and (R) is the correct explanation of (A).
- (2) If (A) & (R) both are correct but (R) is not the correct explanation of (A).
- (3) (A) is incorrect and (R) is correct.
- (4) (A) & (R) both are incorrect.

CMC144

9. Select the correct option for $(\text{NH}_4)_3\text{PO}_4$.

- (A) Ratio of number of oxygen atom to number of hydrogen atom is 1 : 3.
- (B) Ratio of no. of cation to no. of anion is 3 : 1.
- (C) Ratio of no. of g-atom of nitrogen to g-atom of oxygen is 3 : 2.
- (D) Total no. of atoms in one mole of $(\text{NH}_4)_3\text{PO}_4$ is 20.

- (1) A, B both are correct.
- (2) A, B & D are correct.
- (3) C & D both are correct.
- (4) B & C both are correct.

CMC145

10. Select the incorrect statement -

- (A) 1g molecule of any substance contains equal no. of atoms.
- (B) If 2g of $\text{H}_2(\text{g})$ completely reacts with 71g of $\text{Cl}_2(\text{g})$ then 36.5 g of HCl is produced.
- (C) Reactant with minimum no. of moles acts as limiting reagent.
- (D) During a chemical reaction, no. of total moles may increase, decrease or remain constant

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

CMC147

11. Match the column.

Column I		Column II	
(A)	Amount in gram in 20 mol H_2SO_4	(P)	$20 N_A$
(B)	No. of mol of H_2O in 540 g	(Q)	6.02×10^{13}
(C)	No. of atoms in 10^{-10} g H_2	(R)	30
(D)	No. of amu in 20 g	(S)	1960

- (1) (A) $\rightarrow$ (S), (B) $\rightarrow$ (R), (C) $\rightarrow$ (Q), (D) $\rightarrow$ (P)
 (2) (A) $\rightarrow$ (P), (B) $\rightarrow$ (R), (C) $\rightarrow$ (S), (D) $\rightarrow$ (Q)
 (3) (A) $\rightarrow$ (R), (B) $\rightarrow$ (S), (C) $\rightarrow$ (P), (D) $\rightarrow$ (Q)
 (4) (A) $\rightarrow$ (P), (B) $\rightarrow$ (R), (C) $\rightarrow$ (Q), (D) $\rightarrow$ (S)

CMC148

12. The sample containing same no. of 'Na' atoms as there are 'Na' atoms in 5.3 g of Na_2CO_3 is -

- (A) 4g of NaOH
 (B) 5.85 g of NaCl
 (C) 0.25 mol of Na_2SO_4
 (D) 5.6 g of Na_3PO_4

- (1) A & C both are correct.
 (2) B & D both are correct.
 (3) A & B are correct.
 (4) C & D both are correct.

CMC149

13. Match the column.

Column I		Column II	
(A)	8g-atoms of Hydrogen	(P)	2 moles C_3H_4
(B)	6g-atoms of Carbon	(Q)	3 moles CH_3COOH
(C)	6g-atoms of oxygen	(R)	4 moles N_2H_2
(D)	4g-molecules of Nitrogen	(S)	2 moles N_2O_3

- (1) (A) $\rightarrow$ (P,Q) (B) $\rightarrow$ (R,S) (C) $\rightarrow$ (P,S) (D) $\rightarrow$ (P)
 (2) (A) $\rightarrow$ (P,R) (B) $\rightarrow$ (P,Q) (C) $\rightarrow$ (Q,S) (D) $\rightarrow$ (R)
 (3) (A) $\rightarrow$ (P,R) (B) $\rightarrow$ (P,R) (C) $\rightarrow$ (R,S) (D) $\rightarrow$ (S)
 (4) (A) $\rightarrow$ (R,S) (B) $\rightarrow$ (P,S) (C) $\rightarrow$ (Q,R) (D) $\rightarrow$ (Q)

CMC150

EXERCISE-III (Analytical Questions)

ANSWER KEY

Question	1	2	3	4	5	6	7	8	9	10	11	12	13	
Answer	2	1	2	2	4	1	1	3	1	1	1	3	2	