
1) The number of significant figures for the three numbers 161 cm, 0.161 cm, 0.0161 cm are:

- a) 3, 4, and 5 respectively
- b) 3, 4, and 4 respectively
- c) 3, 3, and 4 respectively
- d) 3, 3, and 3 respectively

Answer: d) 3, 3, and 3

2) 0.24 g of a volatile gas, upon vaporisation, gives 45 mL vapour at NTP. What will be the vapour density of the substance?

(Density of $H_2 = 0.089$)

- a) 95.93
- b) 59.93
- c) 95.39
- d) 5.993

Answer: b) 59.93

3) The molecular weight of O_2 and SO_2 are 32 and 64 respectively. At $15^\circ C$ and 150 mmHg pressure, 1 L of O_2 contains 'N' molecules. The number of molecules in 2L of SO_2 under the same conditions of temperature and pressure will be:

- a) 2N
- b) $N/2$
- c) N
- d) 4N

Answer: a) 2N

4) In the final answer of the expression, the number of significant figures is:

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

Answer: c) 3

5) An organic compound contains 78% (by wt.) carbon and the remaining percentage of hydrogen. The right option for the empirical formula of this compound is [At. wt. of C = 12, H = 1]:

- a) CH
- b) CH₂
- c) CH₃
- d) CH₄

Answer: c) CH₃

6) The number of protons, neutrons, and electrons in ${}_{71}^{175}\text{Lu}$, respectively, are:

- a) 104, 71, and 71
- b) 71, 71, and 104
- c) 175, 104, and 71
- d) 71, 104, and 71

Answer: d) 71, 104, and 71

7) Suppose the elements X and Y combine to form two compounds XY₂ and X₃Y₂. When 0.1 mole of XY₂ weighs 10 g and 0.05 mole of X₃Y₂ weighs 9 g, the atomic weights of X and Y are:

- a) 40, 30
- b) 60, 40
- c) 20, 30
- d) 30, 20

Answer: a) 40, 30

8) An organic compound contains carbon, hydrogen, and oxygen. Its elemental analysis gave C = 38.71% and H = 9.67%. The empirical formula of the compound would be:

- a) CH₃O
- b) CH₂O

- c) CHO
- d) CH₄O

Answer: a) CH₃O

9) An element, X has the following isotopic composition:

²⁰⁰X:90%, ¹⁹⁹X 8.0%,

²⁰²X: 2.0 %

The weighted average atomic mass of the naturally occurring element X is closest to:

- a) 201 u
- b) 202 u
- c) 199 u
- d) 200 u

Answer: d) 200 u

10) Which of the following is isoelectronic?

- a) CO₂, NO₂
- b) NO₂, CO₂
- c) CN⁻, CO
- d) SO₂, CO₂

Answer: c) CN⁻, CO

11) An organic compound containing C, H, and N gave the following results on analysis: C = 40%, H = 13.33%, N = 46.67%. Its empirical formula would be:

- a) C₂H₇N₂
- b) CHN
- c) CH₄N
- d) C₂H₇N

Answer: c) CH₄N

12) An organic compound contains C = 40%, O = 53.34%, and H = 6.60%. The empirical formula of the compound is:

- a) CH₂O
- b) CHO
- c) CH₄O₂
- d) C₂H₂O

Answer: a) CH₂O

13) Boron has two stable isotopes, ¹⁰B (19%) and ¹¹B (81%). Calculate the average atomic weight of boron in the periodic table.

- a) 10.8
- b) 10.2
- c) 11.2
- d) 10.0

Answer: a) 10.8

14) While extracting an element from its ore, the ore is ground and leached with dilute KCN solution to form the soluble product potassium argento-cyanide. The element is:

- a) Lead
- b) Chromium
- c) Manganese
- d) Silver

Answer: d) Silver

15) A metal oxide has the formula Z₂O₃. It can be reduced by hydrogen to give free metal and water. 0.1596 g of the metal oxide requires 6 mg of hydrogen for complete reduction. The atomic weight of the metal is:

- a) 27.9
- b) 159.6
- c) 79.8
- d) 55.8

Answer: d) 55.8

16) One mole of carbon atom weighs 12 g, the number of atoms in it is equal to:

- a) 1.2×10^{23}
- b) 6.022×10^{22}
- c) 12×10^{22}
- d) 6.022×10^{23}

Answer: d) 6.022×10^{23}

17) Which one of the following has the maximum number of atoms?

- a) 1g of Mg(s)
- b) 1g of O₂(g)
- c) 1g of Li(s)
- d) 1g of Ag(s)

Answer: c) 1g of Li(s)

18) In which case is the number of molecules of water maximum?

- a) 0.00224 L of water vapours at 1 atm and 273 K
- b) 0.18 g of water
- c) 18 mL of water
- d) 10^{-3} mol of water

Answer: c) 18 mL of water

19) If Avogadro's number N_A is changed from $6.022 \times 10^{23} \text{ mol}^{-1}$ to 6.022×10^{20}

mol^{-1} , this would change:

- a) The definition of mass in units of grams
- b) The mass of one mole of carbon
- c) The ratio of chemical species to each other in a balanced equation
- d) The ratio of elements to each other in a compound

Answer: b) The mass of one mole of carbon

The total number of valence electrons in 4.2 g of N³⁻ ion is (N_A is the Avogadro's number)

- a) 2.1 N_A

b) 4.2 NA

c) 1.6 NA

d) 3.2 NA

Answer: c) 1.6 NA

21) How many grams of concentrated nitric acid solution should be used to prepare 250 mL of 2.0 M HNO₃? The concentrated acid is 70% HNO₃.

a) 45.0 g conc. HNO₃

b) 90.0 g conc. HNO₃

c) 70.0 g conc. HNO₃

d) 54.0 g conc. HNO₃

Answer: a) 45.0 g conc. HNO₃

22) 6.02×10^{20} molecules of urea are present in 100 mL of its solution. The concentration of solution is:

a) 0.02 M

b) 0.01 M

c) 0.001 M

d) 0.1 M

Answer: b) 0.01 M

23) The number of atoms in 0.1 mole of a triatomic gas is:

a) 6.022×10^{22}

b) 1.806×10^{23}

c) 3.600×10^{23}

d) 1.800×10^{22}

Answer: b) 1.806×10^{23}

24) Volume occupied by one molecule of water (density = 1 g/cm³) is:

- a) $9.0 \times 10^{-23} \text{ cm}^3$
- b) $6.023 \times 10^{-23} \text{ cm}^3$
- c) $3.0 \times 10^{-23} \text{ cm}^3$
- d) $5.5 \times 10^{-23} \text{ cm}^3$

Answer: a) c) $3.0 \times 10^{-23} \text{ cm}^3$

25) The maximum number of molecules are present in:

- a) 15 L of H_2 gas at STP
- b) 5 L of N_2 gas at STP
- c) 0.5 g of H_2 gas
- d) 10 g of O_2 gas

Answer: a) 15 L of H_2 gas at STP

26) Percentage of Se in peroxidase anhydrase enzyme is 0.5% by weight. The minimum molecular weight of peroxidase anhydrase enzyme is:

- a) 1.568×10^3
- b) 15.68
- c) 2.168×10^4
- d) 1.568×10^4

Answer: d) 1.568×10^4

27) The number of atoms in 4.25 g of NH_3 is approximately:

- a) 4×10^{23}
- b) 2×10^{23}
- c) 1×10^{23}
- d) 6×10^{23}

Answer: d) 6×10^{23}

28) Haemoglobin contains 0.33% of iron by weight. The molecular weight of haemoglobin is approximately 67200 g. The number of iron atoms (atomic weight of Fe is 56) present in one molecule of haemoglobin are:

- a) 1
- b) 6

- c) 4
- d) 2

Answer: c) 4

29) The number of moles of oxygen in 1 L of air containing 21% oxygen by volume, under standard conditions, is:

- a) 0.0093 mole
- b) 2.10 moles
- c) 0.186 mole
- d) 0.21 mole

Answer: a) 0.0093 mole

30) The total number of valence electrons in 4.2 g of N_3^- ion is:

- a) $2.1 N_a$
- b) $4.2 N_a$
- c) $1.6 N_a$
- d) $3.2 N_a$

Answer: c) $1.6 N_a$

31) The number of gram molecules of oxygen in 6.02×10^{24} molecules of CO_2 is:

- a) 10 g molecules
- b) 5 g molecules
- c) 1 g molecule
- d) 0.5 g molecule

Answer: b) 5 g molecules

32) The number of oxygen atoms in 4.4 g of CO_2 is:

- a) 1.2×10^{23}
- b) 6×10^{22}
- c) 6×10^{23}
- d) 12×10^{23}

Answer: a) 1.2×10^{23}

33) Ratio of C_p and C_v of a gas 'X' is 1:4. The number of atoms of the gas 'X' present in 11.2 L of it at NTP will be:

- a) 6.02×10^{23}
- b) 1.2×10^{23}
- c) 3.01×10^{23}
- d) 2.01×10^{23}

Answer: a) 6.02×10^{23}

34) 1 cc of N_2O_2 at NTP contains:

- a) 1.8×10^{22} atoms
- b) 6.02×10^{23} molecules
- c) 1.32×10^{24} electrons
- d) All of the above

Answer: d) All of the above

35) At STP, the density of CCl_4 vapour in g/L will be nearest to:

- a) 6.87
- b) 3.42
- c) 10.26
- d) 4.57

Answer: a) 6.87

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

- a) 20
- b) 30
- c) 40
- d) 10

Answer: b) 30

37) 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):

- a) 75
- b) 96
- c) 60
- d) 84

Answer: d) 84

38) What is the mass of precipitate formed when 50 mL of 16.9% solution of AgNO_3 is mixed with 50 mL of 5.8% NaCl solution? (Ag = 107.8, N = 14, O = 16, Na = 23, Cl = 35.5):

- a) 28 g
- b) 3.5 g
- c) 7 g
- d) 14 g

Answer: c) 7 g

39) When 22.4 L of $\text{H}_2(\text{g})$ is mixed with 11.2 L of $\text{Cl}_2(\text{g})$, each at STP, the moles of $\text{HCl}(\text{g})$ formed is equal to:

- a) 1 mole of $\text{HCl}(\text{g})$
- b) 2 moles of $\text{HCl}(\text{g})$
- c) 0.5 mole of $\text{HCl}(\text{g})$
- d) 1.5 moles of $\text{HCl}(\text{g})$

Answer: a) 1 mole of $\text{HCl}(\text{g})$

40) 1.0 g of magnesium is burnt with 0.56 g of oxygen in a closed vessel. Which reactant is left in excess and how much?

- a) Mg, 0.16 g
- b) O_2 , 0.16 g
- c) Mg, 0.44 g
- d) O_2 , 0.28 g

Answer: a) Mg, 0.16 g

41) 10 g of hydrogen and 64 g of oxygen were filled in a steel vessel and exploded. Amount of water produced in this reaction will be:

- a) 2 moles
- b) 3 moles
- c) 4 moles
- d) 1 mole

Answer: c) 4 moles

42) 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

Answer: d) 0.029

43) What volume of oxygen gas (O₂) measured at 0°C and 1 atm, is needed to burn completely 1L of propane gas (C₃H₈) measured under the same conditions?

- a) 7 L
- b) 6 L
- c) 5 L
- d) 10 L

Answer: c) 5 L

44) Number of moles of MnO₄⁻ required to oxidize one mole of ferrous oxalate completely in acidic medium will be:

- a) 0.6 mole
- b) 0.4 mole
- c) 7.5 moles
- d) 0.2 mole

Answer: b) 0.4 mole

45) The number of moles of KMnO_4 that will be needed to react with one mole of sulphite ion in acidic solution is:

- a) $4/5$
- b) $2/5$
- c) 1
- d) $3/5$

Answer: b) $2/5$
