DELHI PUBLIC SCHOOL BANGALORE - EAST

CHEMISTRY

ATOMS AND MOLECULES

ANSWER KEY

NAME:_____ CLASS:IX SEC:_____ DATE: _____

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1. Ans : (b) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).

2. Ans : (a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).
3. Ans : (b) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).
   Number of atoms present in a molecule of a gaseous element is called atomicity.
   e.g., O2 has two atoms and hence, its atomicity is 2.
4. Ans : (b) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).
5. Ans : (b) atomicity
6. Ans : (b) cation,positive
7. Ans : (c) 1.5 mol
8. Ans : (c) Sulphate
9. 32g of S = 1mole S = X atoms = N_o
   32g of oxygen = 2 moles Oxygen = 2X atoms = 2x N_o

10. a) $CuBr_2$ b) $Al(NO_3)_3$ c) $Ca_3(PO_4)_2$

11. a) NH_3 14:3 b) CO 3:4 c) M g S 3:4 d) AlF_3 9:19

12. No. of moles of P_4 molecules in 124g of Phosphorus = m/M = 124/ 31 = 4 moles

    No. of P atoms in 1 mole of P_4 = Avogadro constant

    No. of P atoms in 4 moles of P_4 = 4 × Avogadro constant

= $4 \times 6.023 \times 10^{23}$
= 24.092×10^{23}
= 2.4092×10^{24}

13. a) Number of moles of N_2O = m/M M = (2 x 14) + (16) = 44g
    = 5/44 = **0.11 mol**
    Number of moles of NO= m/M M = 14 + 16 = 30g
    = 5/30 = **0.5 mol**
    Ans: 5g of **NO has more no. of moles**

b) Mass of CO_2 = n x M = 1 x 44g = **44 g**

Mass of CO = n x M = 1 x 38g = **38g**

1 mole of CO_2 has higher mass

14. a) No. of molecules in 90g of H_2O

N = (m/M) x N_0

= (90g/18g) x 6.022×10^{23}

= 3.011×10^{24}

b) Number of moles in 19g of H_2O_2

n = m/M M= (1x2) + (2x16) = 34g

= 19g/34g = 0.56 moles

15. Atomic mass unit: 1 amu is the mass unit equal to exactly 1/12 th mass of one atom of carbon12.

Molecular mass	**Molar mass**
It is the sum of the atomic masses of all the Atoms/ molecules of a substance.	Mass of one mole of a substance
It is expressed in "u"	It is expressed in $gmol^{-1}$

16. a) Molecular mass of $CaCO_3$ =100g

100g of $CaCO_3$ contains 6.022×10^{23} molecules

50g of $CaCO_3$ contains X molecules

X= 6.022×10^{23} x 50 g/ 100g

= 3.011×10^{23} molecules

OR

n = m/M = 50/100 = 0.5 moles

n = N/N_A $0.5 = X/6.022 \times 10^{23}$

X = 3.011×10^{23} molecules

b)1 mole of N_2 gas =28g

0.5 mole of N_2 gas = 28gx 0.5 mole

= 14 g

c) No. of moles= Given mass of sodium chloride/ Molar mass of sodium chloride

= 50g/58.5g = 0.855 moles

17. a) 1 mole of CO_2 = 44g of CO_2

Mass of 5 moles of CO_2 = n x M

= 5 x 44= 220g

1mole of H_2O = 18g

Mass of 5 moles of H_2O = n x M

= 5 x 18= 90g

b) Number of moles of Ca

n= m/M

= 240g/40g = 6

Number of moles of Mg

n= m/M

=240g/24g = 10

Ratio of Ca: Mg is 6:10 = 3:5

18. The number of atoms in one mole of hydrogen gas is double the number of atoms in one mole of helium gas because hydrogen molecule is diatomic i.e., a molecule of hydrogen consists of two atoms of hydrogen, whereas helium is monoatomic.

19. **Flask P(O_2)**

No. of Oxygen molecules = n x N_0

No. of Oxygen atoms, N = n x N_0 x 2

= 0.5 x $6.022x10^{23}$ x 2

= **$6.022x10^{23}$ atoms**

Flask Q (O_3)

Number of ozone molecules = n x N_0

Number of oxygen atoms, N = n x N_0 x 3

= 0.4 X $6.022x10^{23}$ X 3

= **$7.23 X 10^{23}$ atoms**

Ans: Flask Q contains more number of oxygen atom

20.

Compound	**Cation**	**Anion**
CH_3COOH	H^+	CH_3COO^-
NaCl	Na^+	Cl^-
NH_4NO_3	NH_4^+	NO_3^-

21. Valency of X = 1

a) X_3N b) X_2O

22. (i) O^{2-} (ii) Fe^{3+} (iii) I^-

23. a) CaF_2 b) H_2S c) CCl_4

24. a) Mass of Carbon dioxide (m) = N/N_0 x M

= 1.0505 $X10^{23}$ x 44g/ $6.022x10^{23}$

= 7.68g

b) 1 mole of Ammonia contains $6.022x10^{23}$ molecules

Number of molecules in 0.25 moles of ammonia = 0.25 x $6.022x10^{23}$

=**$1.5055x 10^{23}$ molecules**

c) Formula unit mass of Na_2SO = (2x23) + (1x32) + (4x16) = **142u**

25. Molar mass of NaCl = 58.5 g

58.5 g of NaCl = 6.022×10^{23} x 2 ions

5.85 of NaCl contains 6.022×10^{23} x 2 x 5.85/58.5 ions

= 1.2044×10^{23} ions

OR

No. of moles of NaCl in 5.85 g NaCl = m/M = 5.85/58.5 = 0.1 moles

0.1 moles = 6.022×10^{23} x 0.1 formula units of NaCl

= 6.022×10^{23} x 0.1 x 2 ions

= 1.2044×10^{23} ions

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