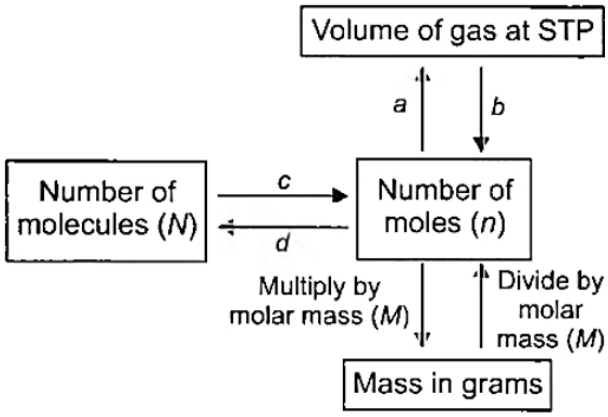
CBSE

ATOMS AND MOLECULES WS 1

Class 09 - Science

Section A

1. What are c and d? **[1]**



a) c = multiply by N_A, d = multiply by N_A

b) c = multiply by N_A, d = divide by N_A

c) c = divide by N_A, d = divide by N_A

d) c = divide by N_A, d = multiply by N_A

2. Two samples X and Y of a pure substance obtained by two different methods contain elements P and Q. Substance X has a mass of 2.25 g and contains 0.90 g of Q. Substance Y is made up of 60% P and 40% Q by weight. This is an illustration of **[1]**

a) Law of conservation of mass

b) Law of multiple proportions

c) Law of simple proportion

d) Law of constant proportions

3. The sample of water from a well is analysed. What will be the ratio of hydrogen and oxygen in it by mass? **[1]**

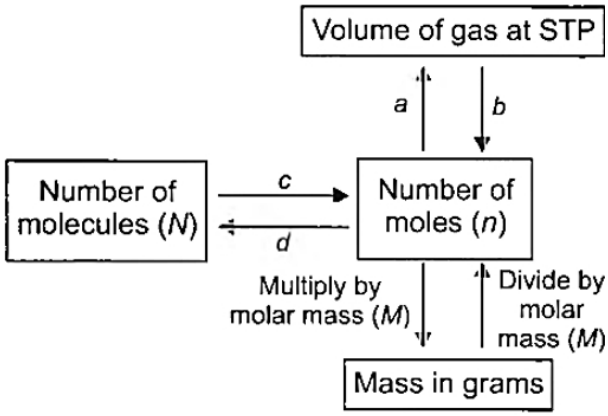
a) 16:1

b) 8:1

c) 1:16

d) 1:8 or 2:16

4. What are a and b? **[1]**



a) a = divide by 22.4 L, b - multiply by 22.4 L

b) a = divide by 22.4 L, b = divide by 22.4 L

c) a = multiply by 22.4 L, b = multiply by 22.4

d) a = multiply by 22.4 L, b = divide by 22.4 L

L

5. Four different experiments were conducted in the following ways: **[1]**

i. 3 g of carbon was burnt in 8 g of oxygen to give 11 g of CO_2.

ii. 1.2 g of carbon was burnt in air to give 4.2 g of CO_2.

iii. 4.5 g of carbon was burnt in enough air to give 11 g of CO_2.

iv. 4 g of carbon was burnt in oxygen to form 30.3 g of CO_2.

Law of constant proportions is not illustrated in experiment(s).

a) i and iii only
b) ii, iii and iv only
c) iv only
d) i only

6. **Assertion (A):** According to the Law of Constant Proportion, in a chemical substance, elements are always present in a definite proportion by mass. **[1]**

Reason (R): The proportion of hydrogen and oxygen is 1 : 8 by mass in a molecule of water.

a) Both A and R are true and R is the correct explanation of A.
b) Both A and R are true but R is not the correct explanation of A.
c) A is true but R is false.
d) A is false but R is true.

7. **Assertion (A):** When 10 g of $CaCO_3$ is decomposed, 5.6 g of residue is left and 4.4 g of CO_2 escapes. **[1]**

Reason (R): Law of conservation of mass is followed.

a) Both A and R are true and R is the correct explanation of A.
b) Both A and R are true but R is not the correct explanation of A.
c) A is true but R is false.
d) A is false but R is true.

8. **Assertion (A):** Dalton's theory is the basic theory about the nature of matter. **[1]**

Reason (R): According to Dalton's theory, all matter is composed of small particles called atoms.

a) Both A and R are true and R is the correct explanation of A.
b) Both A and R are true but R is not the correct explanation of A.
c) A is true but R is false.
d) A is false but R is true.

9. **Assertion (A):** Pure water obtained from different sources such as a river, well, spring, sea, etc. always contains hydrogen and oxygen combined in the ratio of 1: 8 by mass. **[1]**

Reason (R): A chemical compound always contains the same elements combined in the same fixed proportion by mass.

a) Both A and R are true and R is the correct explanation of A.
b) Both A and R are true but R is not the correct explanation of A.
c) A is true but R is false.
d) A is false but R is true.

10. **Assertion (A):** Anions are larger in size than the parent atom. **[1]**

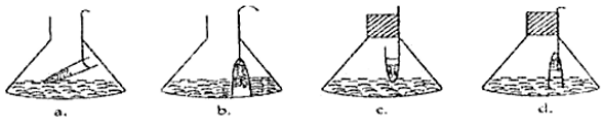
Reason (R): In an anion, the number of protons in the nucleus is less than the number of electrons moving around it.

a) Both A and R are true and R is the correct explanation of A.
b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

11. Which of the following is a correct setup for absorbing the law of conservation of mass in a chemical reaction before the solution is mixed? **[1]**



a) d

b) c

c) a

d) b

12. Match the following with correct response: **[1]**

(1) Smallest Particle (parmanu)	(A) Dalton's atomic theory
(2) Atoms are indivisible	(B) Law of constant proportions
(3) Balanced chemical equation	(C) Law of conservation of mass
(4) Elements combined in fixed ratios	(D) Maharshi Kannad

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

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

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

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

13. Match the following with the correct response**:** **[1]**

(a) The instrument used to produce images of atoms	(i) Compound
(b) The atomic theory of matter	(ii) John Dalton
(c) An allotrope of carbon	(iii) STM
(d) Potassium Sulphate	(iv) Fullerene

a) (a) - (iv), (b) - (i), (c) - (iii), (d) - (ii)

b) (a) - (ii), (b) - (iv), (c) - (i), (d) - (iii)

c) (a) - (iii), (b) - (ii), (c) - (iv), (d) - (i)

d) (a) - (i), (b) - (iii), (c) - (ii), (d) - (iv)

14. During a chemical reaction, the sum of the masses of the reactants and products remains unchanged. This is known as _____. **[1]**

a) Law of Simple proportions

b) Law of conservation of mass

c) Law of multiple proportions

d) Law of constant proportions

15. Identify the correct statement: **[1]**

a) The law of constant proportions was stated by A Lavoisier.

b) The molecules of noble gas elements are diatomic in nature.

c) Dalton was the first to state that the smallest indivisible portion of matter is an atom.

d) The law of conservation of mass was given by Louis Proust.

16. What according to Dalton's atomic theory is true among the following: **[1]**

A. Atom is divisible into protons, electrons, and neutrons.

B. Atoms of the same element have different atomic masses.

C. Atoms are the ultimate indivisible particle of matter.

D. Atoms of the same element have the same atomic masses, size, and chemical properties.

a) A and C

b) All of these

c) C and D

d) B and C

17. What according to Dalton’s atomic theory is true among the following: **[1]**

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c. Atoms are the ultimate indivisible particle of matter.

d. Atoms of the same element have the same atomic masses, size, and chemical properties.

a) All of these

b) (c) and (d) are correct

c) (a) and (b) are correct

d) (a), (b) and (c) are correct

18. A colourless liquid is through to be a pure compound. Analysis the three samples of the material yield the following results **[1]**

	Mass of sample	Mass of carbon	Mass of Hydrogen
Sample 1	1.0 g	0.862 g	0.138 g
Sample 2	1.549 g	1.335 g	0.214 g
Sample 3	0.988 g	0.852 g	0.136 g

Which of the following statement is correct?

a) The material is mixed compound and all three samples have the same composition.

b) The material is pure compound and all three samples have a different compositions.

c) The material is a mixed compound and all three samples have different compositions.

d) The material is pure compound and all three samples have the same composition.

19. Name the Indian philosopher who proposed the theory of matter. **[1]**

20. State the law of constant Proportion? **[1]**

21. Which law of chemical combination deals with the composition of compound? **[1]**

22. State law of conservation of Mass. **[1]**

Section B

23. **State True or False:** **[2]**

(a) Hydrogen and oxygen combine in the ratio of 1 : 8 by mass to form water. **[1]**

(b) A pure chemical compound consists of different elements that are combined together in a different proportion by mass. **[1]**

24. Calculate the mass percentage of oxygen present in the following compounds and state the law of chemical combination associated. Given, H=1, O=16. **[2]**

(i) Water (H_2O) and (ii) Hydrogen per oxide (H_2O_2)

25. Which postulate of Dalton’s atomic theory can explain the law of definite proportions? **[2]**

26. What are the failures of Dalton Atomic theory? **[2]**

27. In a reaction, 5.3 g of sodium carbonate reacted with 6 g of acetic acid. The products were 2.2 g of carbon dioxide, 0.9 g water and 8.2 g of sodium acetic. Show that these observations are in agreement with the law of conservation of mass. **[2]**

sodium carbonate + acetic acid $\rightarrow$ sodium acetic + carbon dioxides + water

28. Which postulate of Dalton's Atomic theory is the basis of law of conservation of mass? **[2]**

29. Which postulate of Dalton's atomic theory is the result of the law of conservation of mass? **[2]**

30. Why is it necessary to balance a chemical equation? **[2]**

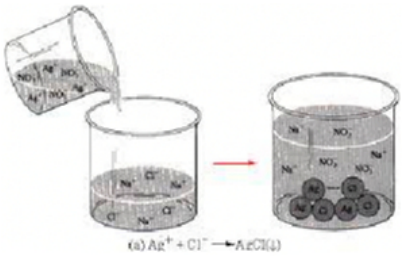
31. Hydrogen and oxygen combine in the ratio of 1:8 by mass to form water. What mass of oxygen gas would be required to react completely with 3 g of hydrogen gas? **[2]**

32. Why are chemical reactions according to law of conservation of mass? **[2]**

Section C

Question No. 33 to 36 are based on the given text. Read the text carefully and answer the questions: **[4]**

When a solution of silver nitrate is added to a solution of sodium chloride, the silver ions combine with the chloride ions to form a precipitate of silver chloride. Thus, Sodium chloride (NaCl) reacts with silver nitrate ($AgNO_3$) to produce silver chloride (AgCl) and sodium nitrate ($NaNO_3$).



33. What mass of silver nitrate will react with 5.85 g of sodium chloride to produce 14.35 g of silver chloride and 8.5 g of sodium nitrate?

34. Calculate the number of oxygen atoms present in 1 gram of calcium carbonate.

35. Calculate the mass of 0.5 mole of nitrogen gas.

36. Calculate the number of molecules in 50 g of NaCl.

[Atomic mass of Ca = 40 u, C = 12 u, O = 16 u, N = 14u, Na = 23u, Cl = 3 5.5u and Na = 6.022×10^{23} mol^{-1}]

37. **Fill in the blanks:** **[4]**

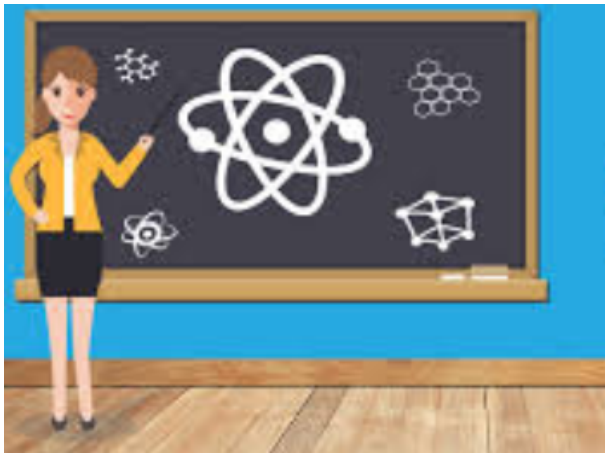
(a) In a chemical reaction, the sum of the masses of the reactants and products remains unchanged. This is called _____. **[1]**

(b) _____ laid the foundation of chemical sciences by establishing two important laws of chemical combination. **[1]**

(c) According to the Law of _____, in a chemical substance, elements are always present in a definite proportion by mass. **[1]**

(d) The _____ states that mass can neither be created nor destroyed in a chemical reaction. **[1]**

38. **Read the passage and answer any four question** **[4]**



Atoms are too small, or they are smaller than anything that we can imagine or compare with. Our entire world is made up of atom. Dalton was the first scientist to use the symbols for elements in a very specific sense.

When he used a symbol for an element he also meant a definite quantity of that element, that is, one atom of that element. In the beginning, the names of elements were derived from the name of the place where they were found for the first time. For example, the name copper was taken from Cyprus. Many of the symbols are the first one or two letters of the element's name in English. The first letter of a symbol is always written as a capital letter (uppercase) and the second letter as a small letter (lowercase)

i. 1m is equal to _____ nm

a. 10^{10}

b. 10^{9}

c. 10^{8}

d. 10^{6}

ii. ⊕ is the symbol of

a. sulphur

b. iron

c. silver

d. mercury

iii. Who suggested the symbol of elements are made from one or two-letter of the atom?

a. Proust

b. Berzelius

c. Boyle

d. Robert

iv. Law of constant proportion is given by:

a. Proust

b. Lavoisier

c. Dalton

d. Berzelius

v. Full form of IUPAC

a. International Union of Pure and Applied Chemistry

b. International Unity of Pure and Applied Chemistry

c. Indian Union of Pure and Applied Chemistry

d. none of these

Section D

39. Fill in the blanks. **[5]**

i. In a chemical reaction, the sum of the masses of the reactants and products remains unchanged. This is called ____.

ii. A group of atoms carrying a fixed charge on them is called ____.

iii. The formula unit mass of $Ca_3(P0_4)2$ is _____.

iv. The Formula of sodium carbonate is ____ and that of ammonium sulphate is _____.