Atoms and Molecules

1M

1. The atomicity of noble gases is (A) Mono-atomic

(B) Octa-atomic

(C) Tri-atomic

(D) Tetra-atomic

1M

2. Write the formula of one polyatomic cation alongwith its valency. . <\$

1M

3. What is the mass of carbon dioxide released in the reaction ? <\$

1M

4. Calculate the number of molecules of carbon dioxide present in 4-4 g of it. <\$>

1M

5. Law of Constant Proportions was given by (A) Newton

(B) Rutherford

(C) Lavoisier

(D) Proust

1M 6. 5g of Calcium (Ca) contains [Atomic mass of Ca = 40u] (A) 1/8mol

(B) 1/7 mol

(C) 1/8g/mol

(D) 1/9mol

1M 7. 1 mole of NH_3 molecules contains (A) 6.022X10²³ NH_3 molecules

(B) 6.022X10²² NH₃ atoms

(C) $6.022X10^{23}$ NH₃ atoms

(D) $6.022X10^{22}$ NH₃ molecules

1M 8. Unit of molar mass is (A) Gm/Molecule

(B) Gm

(C) Moles

(D) gm/mol

1M 9. Valencies of iron are

(A) 2 and 3

(B) 1 and 3

(C) 1, 2 and 3

(D) 1 and 2

1M

10. Cuprous sulphide is the chemical name of (A) CuS

(B) Cu₂S

(C) CuS₂

(D) Cu₃S

1M

11. Mass of 0.5 M of oxygen atom is: (A) 16 g

- (B) 32 g
- (C) 4 g
- (D) 8 g

1M

- 12. An ionic compound is made up of
- (A) Metal-nonmetal
- (B) Cation-Cation
- (C) Anion-Anion
- (D) None of the above

1M

13. Write the chemical formula of "Aluminium phosphate".<\$

1M

14. Atom consists of electron, proton and neutron, which means it is divisible. This statement (A) Strengthens Dalton's Atomic Theory

- (B) Weakens Dalton's Atomic Theory
- (C) Has no effect on Dalton's Atomic Theory
- (D) None of the above

1M

15. When 100g of CaCO $_3$ was heated, it decomposes to yield 56g of CaO and 44g of CO $_2$. This statement proves that

(A) Mass is conserved during a chemical reaction

- (B) There is complete loss of CaCO₃ during a chemical reaction
- (C) Mass of reactant is different from mass of product
- (D) CaCO $_3$ decomposes into Ca and CO $_2$
- 1M

16. Write down the formulae of aluminium sulphate and ethanol.

1M

17. Which are called the building blocks of matter?

1M

- 18. Write the chemical symbols of -
- (c) Tin

(d) Mercury

1M

19. How many metres are there in 1 nanometer (nm)?

1M

20. Define atomicity.

1M

21. Atomicities of phosphorus and ozone are respectively: (A) 4, 3

(B) 2, 2

(C) 2, 3

(D) 4, 2

1M

22. What do we call those particles which have-

(a) Less electrons than the normal atoms.

(b) More electrons than the normal atoms.

1M

23. Cation is formed due to (A) Gain of electrons

(B) Loss of protons

(C) Loss of electrons

(D) Gain of protons

1M

24. Match the following molar masses and choose the answer from the code given below Column IColumn II

(i) Sulphuric acid H₂SO₄ (A) 78g/mol

(ii) Benzene C₆H₆(B)164g/mol

(iii) Sodium Chloride NaCl (C)98g/mol

(iv) Calcium nitrate (d) 58.5g/mol

[Atomic mass of: Ca = 40u, H = 1u, S = 32u, C = 12u,

Na = 23u, N = 14u, O = 16u, Cl = 35.5u]

(A) (i)-C, (ii)-A, (iii)-D, (iv)-B

(B) (i)-B, (ii)-A, (iii)-D, (iv)-C

(C) (i)-C, (ii)-A, (iii)-B, (iv)-D

(D) (i)-A, (ii)-D, (iii)-C, (iv)-B

1M

25. 144 grams of pure water is decomposed by passing electricity. 16 grams of hydrogen and 128 grams of oxygen are obtained. Which chemical law is illustrated by this statement?

1M 26. What is the atomicity of -(a) Ozone (b) Nitrogen

1M 27. What is the atomicity of -(c) Neon (d) Sulphur

1M 28. What name is given to the number 6.023 x 10²³?

1M

29. Select the correct statement and choose the answer from the code given below-

I. Gram molecular mass of a substance contains 6.022X10²³molecules.

II. The molar mass of a substance is the mass of 1 mole of that substance.

III. Gram molecular mass of H_2O is 1.

IV. The molar mass of nitrogen molecule is 28g/mol

(A) I and III

(B) I, II and IV

(C) Only II

(D) All of these

1M

30. Which of the following are ionic compounds?

(i) NH_4^+ (ii) $CaCl_2$ (iii) C_6H_6 (iv) Al_2O_3

- (A) (i) and (ii)
- (B) (ii) and (iv)
- (C) (i) and (iii)
- (D) None of the above

1M

- 31. Select the correct statement and choose the answer from the code given below
- (i) All metals form cations by gaining electrons
- (ii) All metals form cations by losing electrons
- (iii) Hydrogen is a non metal but forms a cation
- (iv) All nonmetals form anions
- (A) (ii) only
- (B) (iii) and (iv)
- (C) (i) and (iii)

(D) (ii), (iii) and (iv)

1M

32. An atom is made up of negatively charged electrons and positively charged protons, still it is electrically neutral. The reason is

(A) The electrons and protons are equal in number so no net charge is present.

(B) The neutrons neutralize the charge and make the atom neutral

(C) The charge on the atom is too small to be detected

(D) Both (1) and (2)

1M

33. When calcium metal (Ca) changes to calcium ion (Ca^{+2}) the number of electron, proton and neutron

(A) Remains same

(B) Number of neutrons remains the same while the number of both protons and electrons changes.

(C) Number of neutrons and protons remains same while the number of electrons decreases by 2.

(D) Number of neutrons and electrons remains the same while number of protons increases by 2

1M

34. What is the contradiction against Dalton's atomic theory in the formula of sucrose, C^22^u ? <\$

1M

35. Select the correct statement and choose the answer from the code given below

I.One mole of all substances in gaseous state contains equal number of particles (6.022X10²³) and occupy equal volume (22.4 L) at STP.

II.One mole of all substances contains equal number of particles (6.022X10²³) at all temperatures and pressure.

III.Avogadro number is equal to 6.022X10²³ particles (atoms, molecules, ions).

IV.One mole of N_2 does not contain same number of molecules as in one mole of $H_{2.}$ (A) I and IV

(B) I and III

(C) I, III and IV

(D) None of these

1M

36. Write the postulate of Dalton's atomic theory that eplains the Law of definite proportions. <\$

1M

37. The number of atoms present in 0.4 mole of Calcium (Ca) are (A) 2.408 X $10^{\rm 23}$

(B) 24.08 X 10²³

(C) 2.408 X 10²⁴

(D) 6.022 X 10²³

1M

38. An element A forms an oxide A_2O_3 , the valency of A is (A) 2

(B) 3

(C) 5

(D) 1

1M 39. Formula mass of ammonium sulphate $(NH_4)_2SO_4$ is (N=14, H=1, O=16 and S=32)

- (A) 114u
- (B) 132u
- (C) 120u
- (D) 132u

1M

40. The chemical formula of Phosphorus and Sulphur are respectively:

- (A) P_4 and S
- (B) P_3 and S_8
- (C) P_4 and S_8
- (D) P_4 and S_6

1M

41. Which of the following gases can exist in atomic form? (A) Oxygen (O)

- (B) Neon (Ne)
- (C) Hydrogen (H)
- (D) Nitrogen(N)

1M 42. Define 'Atomic mass unit' or what is '1 «' ?<\$

1M 43. Write the formula of 'Limestone'. Name the elements present in it. <\$

1M 44. What is the molar mass of a sulphur molecule ? <\$

1M 45. What is Latin name of 'silver' ? What is its symbol ? <\$

1M 46. Write the chemical symbols of -

(a) Silver

(b) Potassium

1M

47. Match the correct formula and choose the answer from the code given below

(i) Hydrogen sulphide (A) CuO

(ii) Ammonia (B) Al₂O₃

(iii) Aluminium oxide (C)H₂S

(iv) Cupric Oxide (D) NH₃ (A) (i)-C,(ii)-A,(iii)-D,(iv)-B

(B) (i)-A, (ii)-D, (iii)- C, (iv)-B

(C) (i)-C, (ii)-D, (iii)-B, (iv)-A

(D) (i)-B, (ii)-D, (iii)-A, (iv)-C

1M

48. Calculate the mass of one amu in kilograms. .

1M

49. Ratio of nitrogen and hydrogen in ammonia (NH $_3$) by mass is: (A) 3 : 1

(B) 1 : 3

(C) 3 :14

(D) 14 : 3

1M

50. Which of the following statement is correct? Choose the answer from the code given below. I Dalton proposed the term Atom

II. Maharishi Kanad proposed the term Atom

III.Atom was considered to be indivisible by Dalton

IV. Kanad said Atom could be further divided

(A) I only

(B) II and IV

(C) I and III

(D) All of these

1M

51. Define 'Atomic mass unit' or what is '1 amu' ?

1M

52. Write the formula of 'Limestone'. Name the elements present in it.

1M

53. What is the molar mass of a sulphur molecule ?

1M

54. What is Latin name of 'silver' ? What is its symbol ?

1M

55. Write the chemical formula of "Aluminium phosphate".

1M

56. Write the postulate of Dalton's atomic theory that eplains the Law of definite proportions.

1M

57. Write the formula of one polyatomic cation alongwith its valency. .

1M

58. Calculate the number of molecules of carbon dioxide present in 4.4 g of it.

1M

59. What is an atom ?

1M

60. Charge on phosphate ion is: (A) -1

- (B) -2
- (C) -3
- (D) +2

1M

61. What do you mean by Molar Mass?

1M

62. What is atomic mass unit?

1M

63. What is the contradiction against Dalton's atomic theory in the formula of sucrose, C_{12} $H_{22}O_{11}$?

1M

64. What are molecules ?

2M

65. What is wrong with the statement 'one mole of hydrogen* ? How would you correct it ?

2M

66. Calculate the mass of carbon present in 1 g of calcium carbonate (CaCO₃).

2M

67. Calculate the mass of one molecule of water.

2M

68. An element M forms the oxide M_2O_3 . What will be the formula of its sulphate ? Explain. $\langle \rangle = \frac{1}{2}$.

69.

72.

. . . .

2M

Which of the following has greater mass ? Justify. 1.11 0.1 mole of CO₂ or 0.2 mole of NH₃

2M

70. Calculate the mass of carbon present in 1 g of calcium carbonate $(CaCO_3)$. <\$

2M

71. Calculate the mass of one molecule of water. <\$>

2M

Which of the following has greater mass ? Justify.. . . .0-1 mole of CO2 or 0-2 mole of NH3 <\$>

2M

73. Carbon and oxygen combine in the ratio of 3 : 8 by mass to form carbon dioxide. What mass of oxygen will be required to combine completely with 4.5 g of carbon ? What would be the mass of carbon dioxide produced ?

2M

74. What is wrong with the statement 'one mole of hydrogen* ? How would you correct it ? <\$>

2M

75. An element M forms the oxide $M_2O_3.$ What will be the formula of its sulphate ? Explain.

2M

76. Write the symbols of the following elements : a. Sodium

b. Calcium

2M

77. Write the symbols of the following elements :

c. Gold

d. Iron

2M

78. What is the law of conservation of mass?

2M

79. What precentage of nitrogenis present in aluminium nitride? (AI = 27, N = 14)?

2M

80. Atoms are not always combined in simple whole number ratio to form molecules. Give one example.

2M

81. Write the formula of the following compound and name the elements present in them.

(a) Ammonia (b) Sulphur dioxide

(c) Ethanol (d) Methane

2M

82. What is the mass of 5 moles of aluminium atoms?(Atomic mass of Al = 27 u)

2M

83. Carbon and oxygen combine in the ratio of 3 : 8 by mass to form carbon dioxide. What mass of oxygen will be required to combine completely with 4-5 g of carbon ? What would be the mass of carbon dioxide produced ?

3M

84. Define ion. Distinguish between an atom and its ion.

3M

85. Calculate the formula unit mass of CuSO₄.5 H₂O. Atomic masses : Cu = 63-5 u, S = 32-0 u, O = 160 u, H = 1.0 u.

3M

86. Calculate the number of molecules present in 1 mL of water. Given that the density of water = 1 g mL¹.

3M

87. What information is conveyed by the formula H_2O' ?

3M

88. What do you understand by one mole of the substance in terms of (i) mass {if) number 1., v i. 7 $\,$

3M

89. What weight in grams is represented by (a) 2 mole of CO_2 (b) 5 mole of NH_3 .

3M

90. What do you understand by one mole of the substance in terms of (i) mass {if) number 1., v i. 7 <\$> .;

3M

91. Distinguish between the molecule of an element and the molecule of a compound?

3M

92. What information is conveyed by the formula H_2O' ? <\$

3M

93. Calculate the number of molecules present in 1 mL of water. Given that the density of water = 1 g mL¹.

3M

94. Calculate the mass of one amu in kilograms. . <\$

3M

95. Calculate the formula unit mass of CuSO₄.5 H₂6. <\$>

3M

96. Calculate the number of molecules in a drop of water weighing 0.75 g. (H = 1, O = 16).

3M

97. Calculate the mass of 3.011 X 10²⁴ molecules of nitrogen gas. (Atomic mass of N=14 u)

3M

98. What do you understand by Formula Unit Mass? Calculate the formula unit masses of K_2CO_3 and ZnO.(Atomic masses of Zn = 65u, K=39u, C=12u)

3M

99. An element X has a valency of 4

(a) What will be the formula of its chloride ?

(b) What will be the formula of its sulphide ?

3M

100. Calculate the number of moles for the following: (a)12.046 * 10^{23} number of He atoms (b)56g of He

5M

101. (a) Calculate the number of atoms of each type in 2.65 g of Na_2CO_3 . (Na = 23, C=12, O=16) (b) State and explain the law of define proportion with an example.

5M

102. (a) What do you mean by Valency? Name two elements which show variable valencies?

(b) 0.24g of compound of Oxygen and Boron was found by analysis to contain 0.096g of Boron and 0.144g of Oxygen. Calculate the percentage composition of compound by weight.

5M

103. (a) Write the names of the following compounds.

(i) H_2S (ii) KNO_3 (iii) CCl_4 (iv) $FeSO_4$

(b) Calculate the number of Aluminium ions in 0.051g of $\mathsf{Al}_2\mathsf{O}_3$

5M

104. What are the postulates of Dalton's Atomic Theory ?

5M

105. What are the postulates of Dalton's Atomic Theory ? How has the theory been modified ? <\$

5M

106. What are the postulates of Dalton's Atomic Theory ? How has the theory been modified ? <\$

5M

107. State and explain the Law of Conservation of Mass. Give one experiment to verify the law.

5M

108. What are the postulates of Dalton's Atomic Theory ?

5M

109. State and explain the Law of Conservation of Mass. Give one experiment to verify the law. <\$