

# MDCAT PREPARATION

## Chemistry

### CHAPTER NO 01

#### Introduction To Fundamental Concepts Of Chemistry

---

1. How many Cl atoms are in 2 moles of Cl:

- ➔ a)  $2 \times 6.022 \times 10^{23}$  atoms
- b)  $35.5 \times 6.022 \times 10^{23}$  atoms
- c)  $2 \times 10^{23}$  atoms
- d)  $2 \times 6.02 \times 10^{22}$  atoms

Hints: moles  $\times$  NA

---

2. One mole of any gas at STP occupies a volume of :

- ➔ a)  $22.414 \text{ dm}^3$
- b)  $23.414 \text{ dm}^3$
- c)  $22.414 \text{ cm}^3$
- d)  $20.414 \text{ dm}^3$

3. If we know the mass of one substance, we can calculate the volume of other substance and vice versa with the help of chemical equation is called:

- a) Mass-mass relationship
- ➡ b) Mass-volume relationship
- c) Mass-mole relationship
- d) Mole-volume relationship

4

4. An organic sample consisting of C, H and O was to combustion analysis. 0.5439g of this compound gave 1.039g carbon dioxide, 0.6369g of water vapors. The empirical formula of this compound is:

- ➡ a)  $CH_3O$
- b)  $C_2H_6O$
- c)  $C_4H_{12}H_2O$
- d)  $CH_4O$

Hints:

$$\begin{aligned} \% \text{ age of C} &= \frac{10.039}{0.5439} \times \frac{12}{44} \times 100 \Rightarrow 52.1 \\ \% \text{ age of H} &= \frac{0.6369}{0.5439} \times \frac{2}{18} \times 100 \Rightarrow 13.1 \\ \% \text{ age of O} &= 100 - (52.1 + 13.1) \\ &= 34.77 \end{aligned}$$

5

5. When 8g (2mole) of  $H_2$  reacts with 2 moles of  $O_2$ . How many moles of water are formed:

- a) 5
- b) 6
- ➡ c) 4
- d) 3

6

6. An organic compound has an empirical formula  $C_3H_3O$  if molar mass of the compound is 110,5. Molecular formula of this organic compound is :  
(pf C = 12, H = 1.008 and O =16)

- a)  $C_6H_6O_2$
- b)  $C_8H_9O_3$
- c)  $C_2H_2O$
- d)  $C_6H_6O_3$

**Hints:**  $MF = n(EF)$  or  $MFM/EFM$

7

7. H burns in Cl to produce HCl. The ratio of masses of reactants in chemical reaction  $H_2 + Cl_2 \rightarrow 2HCl$

- a) 2:35.5
- b) 1:35.5
- c) 1:71
- d) 2:70

**Hints:** 2:71

8

8. How many moles of sodium 0.1g of sodium:

- a)  $4.3 \times 10^{-3}$
- b)  $4.01 \times 10^{-2}$
- c)  $4.03 \times 10^{-1}$
- d)  $4.3 \times 10^{-2}$

9

Q#09. 10g of glucose are dissolved in water to make  $100\text{cm}^3$  of solution, its molarity is:

- a) 0.55
- b) 10
- c) 0.1
- d) 1

10

---

10. A polymer of simpler  $\text{CH}_2$  has molar mass of  $28000\text{g/mol}$ . Its molecular formula will be

- a) 100 times that of its empirical formula
- b) 500 times that of its empirical formula
- c) 200 times that of its empirical formula
- d) 2000 times that of its empirical formula

11

---

11. The no of moles of  $\text{CO}_2$  which contains  $8.0\text{g}$  of oxygen is:

- a) 0.75
- b) 0.25
- c) 1.50
- d) 1.00

12

12. Which of the following has the same no of molecules as in 11g of CO<sub>2</sub>:

- a) 4g of O<sub>2</sub>
- b) 4g of O
- ➔ c) 4.5g of H<sub>2</sub>O
- d)  $\frac{1}{4}$  moles of NaCl

**Hints:** 0.25 moles, NaCl is an ionic compound and does not have molecules.

11

13. The no of molecules of in 9g of Ice (H<sub>2</sub>O) is:

- a)  $6.02 \times 10^{23}$
- b)  $6.02 \times 10^{22}$
- c)  $3.01 \times 10^{22}$
- ➔ d)  $3.01 \times 10^{23}$

**Hints:**  $m/M \times N_A$

14

14. A researcher has prepared a sample of 1-Bromopropane from 10g of 1-Propanol. After purification he had made 12g of the product. Which of the following is percentage yield:

- a) 60%
- b) 90%
- ➔ c) 58%
- d) 50%

**Hints:**

The image shows a handwritten calculation for percentage yield. It starts with 10g, then 12g, and finally 58%.

15

15. Choose the correct option regarding no of particles associated with one mole of a substances:

- a)  $6.02 \times 10^{23}$
- b)  $6.02 \times 10^{22}$
- c)  $6.02 \times 10^{-19}$
- d)  $6.02 \times 10^{23}$

16

16. Calculate the gram of H<sub>2</sub>O formed when 8g of CH<sub>4</sub> burns in excess oxygen:

- a) 21g
- b) 18g
- c) 19g
- d) 5g

Hints:

CH <sub>4</sub>	:	H <sub>2</sub> O
16g	:	36g
1g	:	$\frac{36}{16}$
8g	:	$\frac{36}{16} \times 8$
		18g

17

17. Determine the no of moles of O in 10.6g of NaCO<sub>2</sub>:

- a) 0.4 moles
- b) 0.2 moles
- c) 0.3 moles
- d) none of these

18

18. While finding the atomic mass, which is the following standard is used to compare the atomic mass of chlorine (35.5amu)

- a) neon – 20
- b) nucleon no.
- c) carbon – 13
- ➡ d) carbon – 12

19

Q#19. 3.0 mole of calcium will contain -----g of calcium:

- a) 105gm
- b) 80gm
- c) 100gm
- ➡ d) 120gm

20

20. The formula which shows the simplest whole no ratio for the following atoms of different elements in compound:

- a) ionic formula
- ➡ b) empirical formula
- c) structural formula
- d) molecular formula

21

21. The average atomic mass of Boron is 10.8. It has two isotopes of masses 10 and 11 respectively. What is the percentage of isotope with the average mass of 10?

- a) 80%
- b) 60%
- c) 50%
- d) 20%

Hints:

$$\begin{aligned} \text{Percentage of } ^{10}\text{B} &= x \\ \text{Percentage of } ^{11}\text{B} &= 100 - x \\ \text{RAM} &= \frac{(x \times 10) + ((100 - x) \times 11)}{100} \\ 10.8 &= 100 - 10x + 1100 - 11x \\ 1080 &= 1100 - x \\ -20 &= -x \\ 20\% &= x \end{aligned}$$

22

22. A piece of diamond embedded in a gold weighs 6.0 gram. How many no. of moles of Carbon does it contain:

- a) 6.0 mole
- b) 0.5 mole
- c) 1.0 mole
- d) 1.5 mole

23

23. Which two elements are isotopes?

- a)  $^{12}_6\text{X}$  and  $^{12}_7\text{Y}$
- b)  $^{16}_8\text{X}$  and  $^{16}_8\text{Y}$
- c)  $^{18}_9\text{X}$  and  $^{20}_{10}\text{Y}$
- d)  $^{14}_8\text{X}$  and  $^{15}_8\text{Y}$

Hints: Same atomic no. different mass no.

24



24. The best standard for the calculation of relative atomic masses:

- a) *H* – 1.008
- b) *Carbon* – 12
- c) *Carbon* – 13
- d) *Oxygen* – 16

25

25. How many moles of calcium carbonate are present in 1.75kg of calcium carbonate? (Ca=40, C= 12, O=16)

- a) 0.0175mol
- b) 1.75mol
- c) 17.5mol
- d) 1750mol

26

26. How many oxygen atoms are present in 278g of Hydrated Ferrous Sulphate?

- a)  $6.023 \times 10^{23}$
- b)  $6.525 \times 10^{24}$
- c)  $2.408 \times 10^{23}$
- d)  $6.023 \times 10^{22}$

27

27. According to law of definite proportion, what is the mass ratio of hydrogen and oxygen in water:

- a) H 11.11% and O 88.89%
- b) H 10.11% and O 89.89%
- c) H 20% and O 80%
- d) H 30% and O 70%

28

28. Which contains more atoms?

- a) 7g Mg
- b) 8g Na
- c) 9g Al
- d) All same

**Hints:** Lowest Molar Mass

29

29. The water formed in the combustion analysis is usually absorbed by:

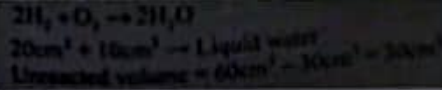
- a)  $\text{Mg}(\text{NO}_3)_2$
- b)  $\text{Mg}(\text{ClO}_4)_2$
- c)  $\text{Mg}(\text{OH})_2$
- d)  $\text{Mg}(\text{ClO}_2)_2$

30

30. A mixture of 10cm oxygen and 50cm of H is spared continuously, what is the theoretical decrease on volume?

- a) 10cm<sup>3</sup>
- b) 15cm<sup>3</sup>
- c) 20cm<sup>3</sup>
- ➔ d) 30cm<sup>3</sup>

Hints:



11

31. Which contains highest percentage of Nitrogen?

- a) NO
- b) NO<sub>2</sub>
- ➔ c) N<sub>2</sub>O
- d) N<sub>2</sub>O<sub>5</sub>

12

32. During stoichiometric calculations, which of the following laws must be followed:

- ➔ a) Law of conservation of mass
- b) Law of conservation of energy
- c) Avogadro's law
- d) Dalton's

13

33. The no of moles of water in 1kg ice are:

- a) 50 mol
- b) 1000 mol
- c) 55.5 mol
- d) 100 mol

14

---

34. The efficiency of chemical reaction can be expressed as:

- a) Theoretical yield
- b) Actual yield
- c) % yield
- d) Maximum yield

15

---

35. The empirical formula of glucose  $C_6H_{12}O_6$  is:

- a)  $C_6H_{12}O_6$
- b) CHO
- c)  $CH_2O$
- d)  $CH_2O_2$

16

36. In a vessel, 10g of N<sub>2</sub> 1g of H<sub>2</sub> and 10g of O<sub>2</sub> are present. Which one will have least no of atoms?

- a) H<sub>2</sub>
- b) N<sub>2</sub>
- c) O<sub>2</sub>
- d) Both A and B

17

37. One amu is equal to:

- a)  $0.666 \times 10^{-27}$  kg
- b)  $1.661 \times 10^{28}$  kg
- c)  $1.661 \times 10^{27}$  kg
- d)  $1.661 \times 10^{-27}$  kg

18

38. Ascorbic acid has high percentage of:

- a) Carbon
- b) Hydrogen
- c) Oxygen
- d) All of the above

19

39. How much Volume of O<sub>2</sub> is required for formation of SO<sub>2</sub> from 0.222 moles of SO<sub>2</sub>:

- a) 22.4L
- b) 11.2L
- c) 2.24L
- d) 1.12L

40

---

40. No of single covalent bonds in water molecules are:

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

41

---

41. No side reaction takes place in :

- a) Spirometry
- b) Stoichiometry
- c) Titrimetry
- d) Spectrometry

42

42. NH<sub>3</sub> can be called:

- a) Molecule of atoms
- b) Molecule of elements
- c) Molecule of compound
- d) Molecule of ion

41

---

43. Diameter of atom is:

- a) 0.2 nm
- b) 0.5nm
- c) 0.9nm
- d) 0.8nm

44

---

44. The mass of present in 2dm<sup>3</sup> of O<sub>2</sub> at STP:

- a) 1.7
- b) 2.35
- c) 2.8
- d) 3.7

45

45.  $\text{NH}_4\text{Cl}$  and  $\text{Ca}(\text{OH})_2$  are react to form Ammonia. What is the mass of ammonia is produce when 100 gram of each is give:

- a) 31.7g
- b) 15g
- c) 28g
- d) 24g

46

46. Mole of N in 20g of  $\text{N}_2$ :

- a) 2
- b) 1/14
- c) 14
- d) 28

47

47. Product of combustion of  $\text{H}_2$  is:

- a)  $\text{CO}_2$
- b)  $\text{H}_2\text{O}$
- c)  $\text{H}_2\text{O}_2$
- d)  $\text{CO}$

48



48. An ordinary microscope can measure the size of object up to or above:

- a) 25nm
- b) 45nm
- c) 500nm
- d) 6nm

49

49. Chemical equations don't tell about the \_\_\_\_ because of certain limitations:

- a) *rate of reaction*
- b) *conditons*
- c) *pressure*
- d) *All of these*

50

Q#50. 18g of water contains \_\_\_\_ atoms of hydrogen:

- a)  $6.022 \times 10^{23}$
- b)  $3 \times 6.022 \times 10^{23}$
- c)  $2 \times 6.02 \times 10^{23}$
- d)  $4 \times 6.22 \times 10^{23}$

51

51. The negative ions having group of atoms is/are:

- a)  $OH^-$
- b)  $OH_3^{-2}$
- c)  $Cr_2O_7^{-2}$
- d) All of these

52

52. The relative atomic mass of copper is:

- a) 63.345 amu
- b) 63.455 amu
- c) 63.55 amu
- d) 63.456 amu

53

53. The concept of \_\_\_\_\_ of gasses helps us to relate solids and liquids in a quantitative manner:

- a) density
- b) molar volume
- c) pressure
- d) temperature

54

54. The study of composition of pure substance in 17<sup>th</sup> century clearly shows that few elements are components of many substances:

- a) Qualitative
- ➔ b) Quantitative
- c) Both A and B
- d) Extensive

55

---

55. In combustion analysis CO<sub>2</sub> is absorbed by:

- ➔ a) 50% KOH
- b) Mg(ClO<sub>4</sub>)<sub>2</sub>
- c) 100% KOH
- d) Anhydrous KOH

56

---

56. Empirical formula of ascorbic acid:

- ➔ a) C<sub>3</sub>H<sub>4</sub>O<sub>3</sub>
- b) C<sub>3</sub>H<sub>2</sub>O<sub>4</sub>
- c) C<sub>2</sub>H<sub>3</sub>O<sub>5</sub>
- d) C<sub>3</sub>H<sub>6</sub>O<sub>3</sub>

57