

# MCQ



## Multiple-Choice Questions on Molarity, Molality, and Mole Fraction

### Molarity (M)

1. What is the molarity of a solution containing 5 moles of solute in 2 liters of solution?
  - a) 2.5 M
  - b) 0.4 M
  - c) 10 M
  - d) 1.5 M
2. Calculate the molarity of a solution prepared by dissolving 58.5 grams of NaCl (molar mass = 58.5 g/mol) in enough water to make 1 liter of solution.
  - a) 1 M
  - b) 0.5 M
  - c) 2 M
  - d) 0.1 M
3. What is the molarity of a solution that contains 0.5 moles of HCl in 250 mL of solution?
  - a) 0.2 M
  - b) 2 M
  - c) 1 M
  - d) 0.5 M
4. A solution is prepared by dissolving 4 moles of glucose in 2 liters of solution. What is the molarity?
  - a) 0.5 M
  - b) 2 M
  - c) 4 M
  - d) 8 M
5. What volume of 3 M NaOH solution is required to obtain 6 moles of NaOH?
  - a) 1 L
  - b) 2 L
  - c) 3 L
  - d) 4 L

### Molality (m)

6. Calculate the molality of a solution prepared by dissolving 10 grams of NaOH (molar mass = 40 g/mol) in 500 grams of water.
  - a) 0.2 m
  - b) 0.5 m
  - c) 0.25 m
  - d) 1 m
7. What is the molality of a solution containing 20 grams of KOH (molar mass = 56 g/mol) dissolved in 200 grams of water?
  - a) 1 m

- b) 2 m
- c) 0.5 m
- d) 0.1 m

8. Calculate the molality of a solution with 5 moles of solute in 1 kg of solvent.

- a) 5 m
- b) 2.5 m
- c) 10 m
- d) 1 m

9. What is the molality of a solution prepared by dissolving 18 grams of glucose (molar mass = 180 g/mol) in 100 grams of water?

- a) 0.1 m
- b) 1 m
- c) 0.5 m
- d) 2 m

10. A solution is made by dissolving 15 grams of urea (molar mass = 60 g/mol) in 300 grams of water. What is the molality?

- a) 0.5 m
- b) 1.5 m
- c) 2 m
- d) 0.25 m

### Mole Fraction ( $\chi$ )

11. Calculate the mole fraction of ethanol ( $C_2H_5OH$ ) in a solution containing 46 grams of ethanol (molar mass = 46 g/mol) and 54 grams of water (molar mass = 18 g/mol).

- a) 0.2
- b) 0.5
- c) 0.4
- d) 0.1

12. What is the mole fraction of solute in a solution containing 1 mole of solute and 9 moles of solvent?

- a) 0.1
- b) 0.9
- c) 0.5
- d) 0.01

13. Calculate the mole fraction of NaCl in a solution containing 1 mole of NaCl and 3 moles of water.

- a) 0.25
- b) 0.75
- c) 0.5
- d) 0.2

14. A solution is prepared by mixing 2 moles of methanol with 8 moles of water. What is the mole fraction of methanol?

- a) 0.2
- b) 0.8
- c) 0.5
- d) 0.25

15. Calculate the mole fraction of benzene in a mixture containing 3 moles of benzene and 7 moles of toluene.

- a) 0.3
- b) 0.7
- c) 0.5
- d) 0.2

## Answer Key

1. a) 2.5 M
2. a) 1 M
3. b) 2 M
4. b) 2 M
5. b) 2 L
6. b) 0.5 m
7. a) 1 m
8. a) 5 m
9. b) 1 m
10. a) 0.5 m
11. b) 0.5
12. a) 0.1
13. a) 0.25
14. a) 0.2
15. a) 0.3