

## Kattar NEET 2026

## Physical Chemistry

## Some Basic Concepts of Chemistry

- Q1** Suppose two elements X and Y combine to form two compounds  $XY_2$  and  $X_2Y_3$ . 0.05 mole of  $XY_2$  weighs 5g while  $3.011 \times 10^{23}$  molecules of  $X_2Y_3$  weigh 85g. The atomic masses of X and Y are respectively  
 (A) 20, 30 (B) 30, 40  
 (C) 40, 30 (D) 80, 60
- Q2** Caffeine has a molecular weight of 194. It contains 28.9% by mass of nitrogen. Number of atoms of nitrogen in one molecule of it:  
 (A) 2 (B) 3  
 (C) 4 (D) 5
- Q3** What is the volume percentage of a solution formed by dissolving 75.0 mL of a solute into 155.0 mL of a solvent?  
 (A) 4.84% (B) 48.4%  
 (C) 32.6% (D) 3.26%
- Q4** The density of water is 1 g/mL. What is the volume occupied by 1 molecule of water?  
 (A)  $1.44 \times 10^{-20}$  mL  
 (B) 1 mL  
 (C) 18 mL  
 (D)  $2.99 \times 10^{-23}$  mL
- Q5** 60 g of solution containing 40% by mass of NaCl are mixed with 100 g of a solution containing 15% by mass NaCl. Determine the mass percent of sodium chloride in the final solution.  
 (A) 24.4% (B) 78%  
 (C) 48.8% (D) 19.68
- Q6** Which of the following is the best example of Law of conservation of mass?  
 (A) 12 g of carbon combines with 32 g of oxygen to form 44 g of  $CO_2$   
 (B) When 12 g of carbon is heated in a vacuum there is no change in mass  
 (C) A sample of air increases in volume when heated at constant pressure but its mass remains unaltered  
 (D) The weight of a piece of platinum is the same before and after heating in air
- Q7** 1.0 g of an oxide of A contained 0.5 g of A. 4.0 g of another oxide of A contained 1.6 g of A. The data indicate the law of  
 (A) Conservation of mass  
 (B) Constant proportions  
 (C) Conservation of energy  
 (D) Multiple proportions
- Q8** If 500ml of 1M solution of glucose is mixed with 500ml of 1M solution of glucose final molarity of solution will be  
 (A) 1 M (B) 0.5 M  
 (C) 2 M (D) 1.5 M
- Q9** Find mass of  $18.066 \times 10^{23}$  molecules of  $NH_3$ ? (If atomic mass of N and H are 14 and 1)  
 (A) 51 g (B) 34 g  
 (C) 17 g (D) 68 g
- Q10** The amount of anhydrous  $Na_2CO_3$  present in 250 ml of 0.25M solution is  
 (A) 6.225 g (B) 66.25 g  
 (C) 6.0 g (D) 6.625 g
- Q11** The hydrated salt  $Na_2CO_3 \cdot xH_2O$  undergoes 63% loss in mass on heating and becomes anhydrous. The value of x is:  
 (A) 10 (B) 12  
 (C) 8 (D) 18
- Q12**



The empirical formula of a compound is  $\text{CH}_2\text{O}$ . 0.0835 moles of the compound contains 1.0 g of hydrogen. Molecular formula of the compound is

- (A)  $\text{C}_6\text{H}_{12}\text{O}_6$  (B)  $\text{C}_5\text{H}_{10}\text{O}_5$   
(C)  $\text{C}_4\text{H}_8\text{O}_8$  (D)  $\text{C}_3\text{H}_6\text{O}_3$

**Q13** A 5.2 molal aqueous solution of methyl alcohol,  $\text{CH}_3\text{OH}$ , is supplied. What is the mole fraction of methyl alcohol in the solution?

- (A) 0.100 (B) 0.190  
(C) 0.086 (D) 0.050

**Q14** According to the equation,  
 $\text{N}_2\text{O}_3(\text{g}) + 6\text{H}_2(\text{g}) \rightarrow 2\text{NH}_3(\text{g}) + 3\text{H}_2\text{O}(\text{g})$   
 How many moles of  $\text{NH}_3(\text{g})$  could be formed from the reaction of 0.22 mol of  $\text{N}_2\text{O}_3(\text{g})$  with 0.87 mol of  $\text{H}_2(\text{g})$ ?

- (A) 0.29 mol (B) 0.44 mol  
(C) 0.73 mol (D) 1.1 mol

**Q15** If 0.5 mol of  $\text{BaCl}_2$  is mixed with 0.1 mole of  $\text{Na}_3\text{PO}_4$ , the maximum number of mole of  $\text{Ba}_3(\text{PO}_4)_2$  that can be formed is

- (A) 0.7 (B) 0.05  
(C) 0.30 (D) 0.10

**Q16** If  $10^{21}$  molecules are removed from 200 mg of  $\text{CO}_2$ , then the number of moles of  $\text{CO}_2$  left are

- (A)  $2.88 \times 10^{-3}$   
(B)  $28.8 \times 10^{-3}$   
(C)  $0.288 \times 10^{-3}$   
(D)  $1.68 \times 10^{-2}$

**Q17** Given,  $5 \times 10^3$  kg of urea is dissolved in  $2 \times 10^3$  kg of water. Calculate the percent by mass of urea.

- (A) 90% (B) 71.42%  
(C) 70% (D) 80%

**Q18** Dissolving 120 g of urea (mol. wt. 60) in 1000 g of water gave a solution of density 1.15 g/mL. The molarity of the solution is

- (A) 1.78 M (B) 2.00 M  
(C) 2.05 M (D) 2.22 M

**Q19** What is the concentration of nitrate ions if equal volumes of 0.1 M  $\text{AgNO}_3$  and 0.1 M  $\text{NaCl}$  are

mixed together?

- (A) 0.1 M (B) 0.2 M  
(C) 0.05 M (D) 0.25 M

**Q20** 90 gm glucose is dissolved in 800 gm water to get a solution of density  $\frac{89}{80} \text{ gm/ml}$ . The

**correct** concentration of solution is:

- (A)  $\frac{90}{8} \% (\text{w/w})$  (B)  $\frac{90}{8} \% (\text{w/v})$   
(C) 0.625% (w/w) (D) 0.625% (w/v)

**Q21**  $\text{Fe}_2\text{O}_3$  reacts with excess  $\text{CO}$  at a high temperature according to the equation below:



If 6.50 g of  $\text{Fe}_2\text{O}_3$  yields 3.85 g of  $\text{Fe}$ , what is the percentage yield of the reaction?

- (A) 59.2% (B) 69.9%  
(C) 76.3% (D) 84.7%

**Q22** One mole of potassium chlorate ( $\text{KClO}_3$ ) is thermally decomposed and excess of aluminium is burnt in the gaseous product. How many mol of aluminium oxide ( $\text{Al}_2\text{O}_3$ ) are formed?

- (A) 1 (B) 1.5  
(C) 2 (D) 3

**Q23** Given below are two statements:

**Statement I:** One molal aqueous solution of glucose contains 180 g of glucose in 1 kg of water.

**Statement II:** A solution containing one mole of solute in 1000 g of solvent is called one molal solution.

In the light of the above statements, choose the most appropriate answer from the options given below:

- (A) Statement I is correct but Statement II is incorrect.  
(B) Statement I is incorrect but Statement II is correct.  
(C) Both Statement I and Statement II are correct.  
(D) Both Statement I and Statement II are incorrect.

**Q24** 1.0 g of magnesium is burnt with 0.56 g  $\text{O}_2$  in a closed vessel. Which reactant is left in excess and



how much?

(At. wt. Mg = 24; O = 16)

- (A) Mg, 0.16 g                      (B) O<sub>2</sub>, 0.16 g  
(C) Mg, 0.44 g                      (D) O<sub>2</sub>, 0.28 g

**Q25** Match List-I with List-II.

List-I (Numbers)		List-II (Significant figures)	
(A)	$2.653 \times 10^4$	(I)	2
(B)	1.00368	(II)	3
(C)	65.4	(III)	6
(D)	0.36	(IV)	4

Choose the **correct** answer from the options given below:

- (A) A-IV; B-III; C-II; D-I  
(B) A-I; B-III; C-II; D-IV  
(C) A-II; B-IV; C-III; D-I  
(D) A-IV; B-I; C-II; D-III

**Q26** Given below are two statement: one is labelled as Assertion A and the other is labelled as Reason R:

**Assertion A:** The number of oxygen atoms in 1 g of O<sub>2</sub>, 1 g of O<sub>3</sub> and 1 g of atomic oxygen is same.

**Reason R:** O<sub>2</sub> and O<sub>3</sub> have different molar masses.

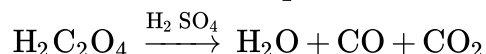
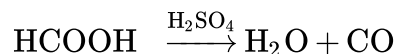
In the light of the above statements, choose the **correct** answer from the options given below:

- (A) A is true but R is false.  
(B) A is false but R is true.  
(C) Both A and R are true and R is the correct explanation of A.  
(D) Both A and R are true but R is NOT the correct explanation of A.

**Q27** How many moles of Mg<sub>3</sub>(PO<sub>4</sub>)<sub>2</sub> will contain 0.4 mole of oxygen atoms ?

- (A) 0.75                      (B) 0.25  
(C) 0.50                      (D) 0.05

**Q28** A mixture of 2.3 g of formic acid (HCOOH) and 4.5g of oxalic acid (H<sub>2</sub>C<sub>2</sub>O<sub>4</sub>) is treated with Conc. H<sub>2</sub>SO<sub>4</sub> as shown



The evolved gaseous mixture is passed through KOH pellets. The mass of remaining product at STP will be (Given : CO and CO<sub>2</sub> are neutral and acidic in nature respectively).

- (A) 1.2g                      (B) 2.4g  
(C) 2.8g                      (D) 4g

**Q29** The mass percentage of nitrogen in Urea (NH<sub>2</sub>CONH<sub>2</sub>) is;

- (A) 46.66 %                      (B) 32.48 %  
(C) 52.22 %                      (D) 38.88 %

**Q30** What is the molality of aq. H<sub>2</sub>SO<sub>4</sub> solution in which mole fraction of H<sub>2</sub>SO<sub>4</sub> is 0.1?

- (A) 5.23m                      (B) 4.81 m  
(C) 7.45 m                      (D) 6.17m

**Q31** A Biomolecule Contains 0.1 % Mg by mass. The minimum molecular mass of biomolecule will be;

- (A) 12000 u                      (B) 24000 u  
(C) 36000 u                      (D) 48000 u

**Q32** Which of the following concentration terms is affected by temperature ?

- (I) Molarity  
(II) Density  
(III) Molality  
(A) I and II only  
(B) II and III only  
(C) I and III only  
(D) I, II and III

**Q33** Given below are two statements: one is labelled as Assertion A and the other is labelled as Reason R:

**Assertion A:** Formula mass is used for NaCl instead of molecular mass.

**Reason R:** In solid state, NaCl exist as single entity.

In the light of the above statements, choose the **correct** answer from the options given below:

- (A) A is true but R is false.  
(B) A is false but R is true.



- (C) Both A and R are true and R is the correct explanation of A.  
 (D) Both A and R are true but R is NOT the correct explanation of A.

**Q34** Match List-I with List-II.

	List-I		List-II
(A)	2.24 L of O <sub>2</sub> at STP	(I)	0.32 g
(B)	$6.022 \times 10^{21}$ molecules of O <sub>2</sub>	(II)	32 g
(C)	1 g molecule of O <sub>2</sub>	(III)	0.032 g
(D)	0.001 mole O <sub>2</sub>	(IV)	3.2 g

Choose the **correct** answer from the options given below:

- (A) A-IV, B-I, C-II, D-III  
 (B) A-IV, B-III, C-II, D-I  
 (C) A-II, B-III, C-IV, D-I  
 (D) A-II, B-I, C-III, D-IV
- Q35** 5 moles of AB<sub>2</sub> weights 100 g and 10 moles of A<sub>2</sub>B weights 300g.  
 The molar mass (in g mol<sup>-1</sup>) of A and B respectively are:  
 (A)  $\frac{40}{3}$  and  $\frac{20}{3}$   
 (B)  $\frac{40}{3}$  and  $\frac{10}{3}$   
 (C)  $\frac{20}{3}$  and  $\frac{10}{3}$   
 (D)  $\frac{10}{3}$  and  $\frac{20}{3}$
- Q36** Given below are two statements:  
**Statement I:** Dalton's Law could explain all the laws of chemical combinations.  
**Statement II:** Precision refers to the closeness of various measurements for the same quantity.  
 In the light of the above statements, choose the most appropriate answer from the options given below:  
 (A) Statement I is correct but Statement II is incorrect.  
 (B) Statement I is incorrect but Statement II is correct.  
 (C) Both Statement I and Statement II are correct.  
 (D)

Both Statement I and Statement II are incorrect.

- Q37** The number of electrons in 0.6 g of CO<sub>3</sub><sup>2-</sup> is;  
 (A) 0.3 N<sub>A</sub> (B) 0.62 N<sub>A</sub>  
 (C) 0.6 N<sub>A</sub> (D) 0.32 N<sub>A</sub>
- Q38**  $3.011 \times 10^{23}$  atoms of an element has mass 2g. The atomic mass of the element is;  
 (A) 1 u (B) 6 u  
 (C) 2 u (D) 4 u
- Q39** The concentration of H<sup>+</sup> ions in a solution obtained by mixing 200 ml of 0.1 M H<sub>2</sub>SO<sub>4</sub> with 100 ml of 0.1 M NaOH will be;  
 (A) 0.5 M (B) 0.75 M  
 (C) 0.1 M (D) 0.2 M
- Q40** The density of 5M nitric acid solution in which mass percent of nitric acid is 31.5%; is;  
 (A) 0.5 g mL<sup>-1</sup>  
 (B) 1.5 g mL<sup>-1</sup>  
 (C) 1.25 g mL<sup>-1</sup>  
 (D) 1 g mL<sup>-1</sup>
- Q41** 2g of M<sub>2</sub>CO<sub>3</sub> on treatment with excess HCl produces 0.01 mole of CO<sub>2</sub>. The molar mass of M (in g mol<sup>-1</sup>) is;  
 (A) 70 (B) 50  
 (C) 60 (D) 40
- Q42** Given than abundance of isotopes 40<sup>X</sup>, 42<sup>X</sup> and 44<sup>X</sup> are 10%, 80% and 10% respectively. The average atomic mass of X is:  
 (A) 41.8 (B) 42.0  
 (C) 42.4 (D) 42.2
- Q43** For the reaction;  

$$\text{N}_2(\text{g}) + 3\text{H}_2(\text{g}) \rightarrow 2\text{NH}_3(\text{g})$$
 Identify the N<sub>2</sub> as a limiting reagent in the following mixtures  
 (A) 56g N<sub>2</sub> + 10g H<sub>2</sub>  
 (B) 10g N<sub>2</sub> + 6g H<sub>2</sub>  
 (C) 28g N<sub>2</sub> + 4g H<sub>2</sub>  
 (D) 14g N<sub>2</sub> + 2g H<sub>2</sub>

**Q44**



A solution of sodium sulphate contains 69g of  $\text{Na}^+$  per kilogram of water. The molality of sodium sulphate in the solution is;

- (A) 3m (B) 2m  
(C) 1.5m (D) 2.5m

**Q45** 2 g of activated charcoal was added to 100 ml of 0.04M acetic acid solution in a flask. After some time it was filtered and strength of filtrate was found to be 0.02M. The mass of acetic acid ( $\text{CH}_3\text{COOH}$ ) adsorbed per gram of charcoal is;

- (A) 0.02 g (B) 0.04 g  
(C) 0.06 g (D) 0.08 g

**Q46** If the density of methanol is  $0.8 \text{ Kg L}^{-1}$ , what is the volume needed for making 2.5 L of its 0.25 M solution?

- (A) 35 ml (B) 30 ml  
(C) 40 ml (D) 25 ml

**Q47** Volume of water required to obtain 0.15 M HCl solution from 0.2 M, 100 mL HCl solution is;

- (A) 133.33 mL (B) 43.43 mL  
(C) 55.55 mL (D) 33.33 mL

**Q48** 5.6 L of a gas has mass 11g at STP. The gas may be;

- (A)  $\text{O}_3$  (B)  $\text{N}_2\text{O}$   
(C)  $\text{CO}_2$  (D)  $\text{SO}_2$

**Q49** Mass of one molecule of nitrogen gas is:

- (A) 28 g (B) 14 g  
(C)  $\frac{28}{N_A}$  g (D)  $14N_A$  g

**Q50** The empirical formula of hydrocarbon that contains 81.82% carbon is;

- (A)  $\text{C}_3\text{H}_4$  (B)  $\text{C}_3\text{H}_2$   
(C)  $\text{CH}_2$  (D)  $\text{C}_3\text{H}_8$



## Answer Key

Q1 (C)  
Q2 (C)  
Q3 (C)  
Q4 (D)  
Q5 (A)  
Q6 (A)  
Q7 (D)  
Q8 (A)  
Q9 (A)  
Q10 (D)  
Q11 (A)  
Q12 (A)  
Q13 (C)  
Q14 (A)  
Q15 (B)  
Q16 (A)  
Q17 (B)  
Q18 (C)  
Q19 (C)  
Q20 (B)  
Q21 (D)  
Q22 (A)  
Q23 (C)  
Q24 (A)  
Q25 (A)

Q26 (D)  
Q27 (D)  
Q28 (C)  
Q29 (A)  
Q30 (D)  
Q31 (B)  
Q32 (A)  
Q33 (A)  
Q34 (A)  
Q35 (B)  
Q36 (B)  
Q37 (D)  
Q38 (D)  
Q39 (C)  
Q40 (D)  
Q41 (A)  
Q42 (B)  
Q43 (B)  
Q44 (C)  
Q45 (C)  
Q46 (D)  
Q47 (D)  
Q48 (C)  
Q49 (C)  
Q50 (D)



## Hints & Solutions

**Q1 Text Solution:**

(C)

Let molar mass of XY = 5g / 0.05 mol = 100 g/mol.

Given:  $3.011 \times 10^{23}$

molecules = 0.5 mol of  $X_2Y_3$  = 85g

Molar mass = 170 g/mol.

Solving:  $x + y = 100$  and  $2x + 3y = 170$  gives  $x = 40$ ,  $y = 30$

**Q2 Text Solution:**

Nitrogen % = 28.9%, Molecular mass = 194.

Mass of N = 0.289194 = 56.07 g.

Number of N atoms = 56.07 / 14 = 4.

**Q3 Text Solution:**

(C)

Volume % =  $75 / (75 + 155) \times 100 = 32.6\%$

**Q4 Text Solution:**

Molar volume of water = 18 mL/mol.

Volume of one molecule =  $18 / 6.022 \times 10^{23} = 2.99 \times 10^{-23}$  mL.

**Q5 Text Solution:**

(A)

First solution: 60 g, 40% NaCl  $\rightarrow$  NaCl = 0.40 x 60 = 24 g

Second solution: 100 g, 15% NaCl  $\rightarrow$  NaCl = 0.15 x 100 = 15 g

Total mass of solution:

60 + 100 = 160 g

Total NaCl:

24 + 15 = 39g

Final mass % of NaCl:

$\frac{39}{160} \times 100 = 24.375\% \rightarrow 24.4\%$

**Q6 Text Solution:**

$12\text{g C} + 32\text{g O}_2 \rightarrow 44\text{g CO}_2$  matches Law of Conservation of Mass

**Q7 Text Solution:**

(D)

Different oxides show different ratios.

$\frac{0.5}{1} = 0.5$ ;  $\frac{1.6}{4} = 0.4$

$0.5:0.4 = 5:4$ ,

Hence law of multiple proportions.

**Q8 Text Solution:**

(A)

Both are 1M, same solute and volume no change in molarity. Final molarity = 1M.

**Q9 Text Solution:**

(A)

$18.066 \times 10^{23}$  molecules = 3 mol.

Mass =  $3 \times 17 = 51\text{g}$ .

**Q10 Text Solution:**

(D)

Moles =  $0.25 \times 0.25 = 0.0625$  mol;

Mass =  $0.0625 \times 10^6 = 6.625\text{g}$ .

**Q11 Text Solution:**

(A)

Assume molar mass of hydrated salt = M.

Anhydrous = 106g, loss = 63%.

So, total = 286g water lost = 180g = 10 mol  $x = 10$ .

**Q12 Text Solution:**

(A)

$0.0835$  mol 1.0g H Molar mass =  $\frac{1}{0.0835} = 12$ .

High molar mass =  $\text{C}_6\text{H}_{12}\text{O}_6$ .

**Q13 Text Solution:**

(C)

Molality = 5.2 mol/kg.

Total moles = 5.2 ( $\text{CH}_3\text{OH}$ ) + 55.5 (water)

Mole fraction =  $5.2 / (5.2 + 55.5) = 0.086$ .

**Q14 Text Solution:**

(A)

Limiting reagent is  $\text{N}_2\text{O}_3$ : 1 mol makes 2 mol  $\text{NH}_3$

0.22 mol makes 0.44 mol  $\text{NH}_3$  max;  $\text{H}_3$  in excess.

**Q15 Text Solution:**

(B)

$\text{BaCl}_2 + \text{Na}_3\text{PO}_4 \rightarrow \text{Ba}_3(\text{PO}_4)_2$ . 3  $\text{BaCl}_2$  : 2  $\text{Na}_3\text{PO}_4$  LR =  $\text{Na}_3\text{PO}_4$  0.1 mol forms 0.05 mol.

**Q16 Text Solution:**

(A)





**Step 1:** Moles in 0.2 g of  $\text{CO}_2$

$$\text{Moles } \frac{0.2}{44} \approx 0.00455 \text{ mol}$$

**Step 2:** Convert removed molecules to moles

$$\text{Moles removed} = \frac{10^{21}}{6.022 \times 10^{23}} \approx 0.00166 \text{ mol}$$

**Step 3:** Moles left

$$0.00455 - 0.00166 = 0.00289 \text{ mol}$$

So, answer is  $2.88 \times 10^{-3} \text{ mol}$

**Q17 Text Solution:**

(B)

Total mass of solution = mass of urea + mass of water

$$= 5 \times 10^3 + 2 \times 10^3 = 7 \times 10^3 \text{ kg}$$

Percent by mass of urea:

$$\begin{aligned} \text{Percent} &= \left( \frac{\text{Mass of urea}}{\text{Total mass}} \right) \times 100 = \left( \frac{5 \times 10^3}{7 \times 10^3} \right) \times 100 \\ &= \left( \frac{5}{7} \right) \times 100 \approx 71.42\% \end{aligned}$$

**Q18 Text Solution:**

(C)

120g urea = 2 mol;

$$\text{Volume} = \frac{\text{mass}}{\text{density}} = \frac{1120}{1.15} = 973.91 \text{ mL} = 0.974 \text{ L}$$

$$\text{Molarity} = \frac{2}{0.974} = 2.05 \text{ M}$$

**Q19 Text Solution:**

(C)

Equal volumes of 0.1 M  $\text{AgNO}_3$  and 0.1 M  $\text{NaCl}$

$\text{NO}_3$  remains = 0.05 M after ppt

**Q20 Text Solution:**

(B)

- Solute (glucose) = 90 g
  - Solvent (water) = 800 g
  - Total solution mass = 90 + 800 = 890 g
  - Density =  $\frac{89}{80} \text{ g/mL} = 1.1125 \text{ g/mL}$
  - Volume of solution =  $\frac{890}{1.1125} \approx 800 \text{ mL}$
- $$\frac{90}{800} \times 100 = \frac{90}{8} = \boxed{\frac{90}{8} \% (w/v)}$$

**Q21 Text Solution:**

(D)

$$\text{Fe}_2\text{O}_3 = 6.5 \text{ g mol} = \frac{6.5}{159.6} = 0.0407 \text{ mol expected}$$

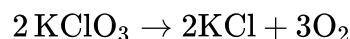
$$\text{Fe} = 0.0814 \text{ mol} = 0.081456 = 4.56 \text{ g};$$

$$\text{actual} = 3.85 \text{ g. \% yield} = \frac{3.85}{4.56} \times 100 = 84.6\%.$$

**Q22 Text Solution:**

(A)

Potassium chlorate decomposes on heating to give potassium chloride and oxygen gas:



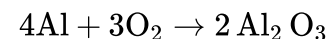
So, 2 moles of  $\text{KClO}_3$  give 3 moles of  $\text{O}_2$ .

$\Rightarrow$  Therefore,

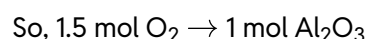
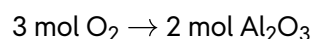
$$1 \text{ mole of } \text{KClO}_3 \text{ gives: } \frac{3}{2} = 1.5 \text{ mol of } \text{O}_2$$

**Step 2:** Reaction of Aluminium with Oxygen

Balanced reaction for aluminium with oxygen:



From this equation:



**Q23 Text Solution:**

(C)

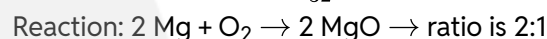
Both definitions are correct.

**Q24 Text Solution:**

(A)

$$\text{Mg} = 1.0 \text{ g} \rightarrow \text{Moles} = \frac{1}{24} = 0.0417 \text{ mol}$$

$$\text{O}_2 = 0.56 \text{ g} \rightarrow \text{Moles} = \frac{0.56}{32} = 0.0175 \text{ mol}$$



Compare Required Ratio:

To react with 0.0175 mol  $\text{O}_2 \rightarrow$  needs 0.035 mol Mg

Available Mg = 0.0417 mol  $\rightarrow$  Mg is in excess

$$\text{Excess Mg} = 0.0417 - 0.035 = 0.0067 \text{ mol} = 0.16 \text{ g}$$

**Q25 Text Solution:**

(1)

$2.653 \times 10^4$	4
1.00368	6
65.4	3
0.36	2

**Q26 Text Solution:**

(D)

The number of O atoms in 1 g of  $\text{O}_2$  =

$$\frac{1}{32} \times 2 \times N_A = \frac{N_A}{16}$$

The number of O atoms in 1 g of  $\text{O}_3$  =

$$\frac{1}{48} \times 3 \times N_A = \frac{N_A}{16}$$

The number of O atoms in 1 g of atomic oxygen

$$= \frac{N_A}{16}$$

Hence, number of O atoms are same.





1g of  $O_2$ ,  $O_3$ ,  $O$ : different number of atoms due to different molar masses different moles A and R both true but not directly connected.

**Q27 Text Solution:**

1 mole  $Mg_3(PO_4)_2$  Contain 8 mole of O-atoms.

$\therefore 0.75$  mole O-atoms

$$= \frac{1}{8} \times 0.4 = 0.05 \text{ mol of Compound}$$

**Q28 Text Solution:**

$$n_{HCOOH} = \frac{2.3}{46} = 0.05$$

$$n_{H_2C_2O_4} = \frac{4.5}{90} = 0.05$$

$$n_{CO_2} \text{ produced} = n_{H_2C_2O_4} = 0.05$$

$$n_{CO} \text{ produced} = n_{H_2C_2O_4} + n_{HCOOH}$$

$$= 0.05 + 0.05$$

$$= 0.1$$

$\therefore$  KOH will absorb  $CO_2$

mass of CO(remaining product)

$$= 0.1 \times 28$$

$$= 2.8 \text{ g}$$

**Q29 Text Solution:**

Urea:  $NH_2CONH_2$

Molar mass = 60

$$\% \text{ of N} = \frac{28}{60} \times 100$$

$$= 46.66 \%$$

**Q30 Text Solution:**

$$X_{H_2SO_4} = 0.1$$

$$\therefore n_{H_2SO_4} = 0.1$$

$$N_{H_2O} = 0.9$$

$$W_{H_2O} = 0.9 \times 18 \text{ g}$$

$$\text{Molality} = \frac{0.1}{0.9 \times 18 \times 10^{-3}} = 6.17 \text{ m}$$

**Q31 Text Solution:**

$$\% \text{ by mass} = \frac{\text{mass of element}}{\text{molar mass}} \times 100$$

$$0.1 = \frac{24 \times 100}{\text{minimum molar mass}}$$

$$\therefore \text{minimum molar mass} = 24000 \text{ u}$$

**Q32 Text Solution:**

Molarity and density involve volume so affected by temperature.

**Q33 Text Solution:**

Formula mass is used for NaCl instead of molecular mass as in solid state NaCl does not exist as single entity.

**Q34 Text Solution:**

$$\bullet \text{ } 2.24 \text{ L } O_2: \frac{2.24}{22.4} \times 32 = 3.2 \text{ g}$$

$$\bullet \text{ } 6.022 \times 10^{21} \text{ molecules:}$$

$$\frac{6.022 \times 10^{21}}{6.022 \times 10^{23}} \times 32 = 0.32 \text{ g}$$

$$\bullet \text{ } 1 \text{ g molecule: } 1 \text{ mole of } O_2 = 32 \text{ g}$$

$$\bullet \text{ } 0.001 \text{ mol: } 0.001 \times 32 = 0.032 \text{ g}$$

**Q35 Text Solution:**

$$AB_2: 5(a + 2b) = 100$$

$$A_2B: 10(2a + b) = 300$$

$$\text{on solving; } a = \frac{40}{3} \text{ g mol}^{-1}$$

$$b = \frac{10}{3} \text{ g mol}^{-1}$$

**Q36 Text Solution:**

Dalton's theory could not explain the laws of gaseous volumes.

**Q37 Text Solution:**

$$\begin{aligned} \text{No. of electron} &= \frac{0.6}{60} \times N_A \times 32 \\ &= 0.32 N_A \end{aligned}$$

**Q38 Text Solution:**

atomic mass (mass of  $N_A$  atoms)

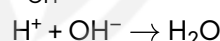
$$= \frac{2}{3.011 \times 10^{23}} \times 6.022 \times 10^{23}$$

$$= 4u$$

**Q39 Text Solution:**

$$n_{H^+} = 0.1 \times 200 \times 10^{-3} \times 2 = 4 \times 10^{-2}$$

$$n_{OH^-} = 0.1 \times 100 \times 10^{-3} \times 1 = 1 \times 10^{-2}$$



$$\begin{aligned} n_{H^+} \text{ remaining} &= 4 \times 10^{-2} - 1 \times 10^{-2} \\ &= 3 \times 10^{-2} \end{aligned}$$

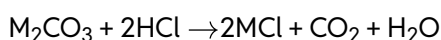
$$[H^+]_{\text{final}} = \frac{3 \times 10^{-2}}{300 \times 10^{-3}} = 0.1 \text{ M}$$

**Q40 Text Solution:**

$$M = \frac{\% \text{ by mass} \times d(\text{g/ml}) \times 10}{\text{molar mass}}$$

$$5 = \frac{31.5 \times d \times 10}{63}$$

$$d = \frac{5 \times 63}{31.5 \times 10} = 1 \text{ g mL}^{-1}$$

**Q41 Text Solution:**

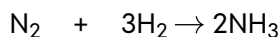
$$n_{M_2CO_3} = n_{CO_2}$$

$$\frac{2}{2M+60} = 0.01$$

$$\therefore M = 70 \text{ g mol}^{-1}$$

**Q42 Text Solution:**

$$\text{Average atomic mass} = \frac{40 \times 10 + 42 \times 80 + 44 \times 10}{100} = 42$$

**Q43 Text Solution:**

$$1 \text{ mol} \quad 3 \text{ mol}$$

$$1 \times 28 \text{ g} \quad 3 \times 2 \text{ g}$$

$$28 \text{ g} \quad 6 \text{ g}$$

$\therefore$  for 6g  $\text{H}_2$  only 10g  $\text{N}_2$  is present (LR) in option (B).

**Q44 Text Solution:**

$$\text{Molality of Na}^+ = \frac{\left(\frac{69}{23}\right)}{1} = 3 \text{ m}$$

$$\therefore \text{molality of Na}_2\text{SO}_4 = \frac{3}{2} = 1.5 \text{ m}$$

**Q45 Text Solution:**

mass of acetic acid adsorbed

$$= (0.04 - 0.02) \times 100 \times 10^{-3} \times 60 \text{ g}$$

$$= 0.12 \text{ g}$$

Mass adsorbed per gram of charcoal

$$= \frac{0.12}{2} = 0.06 \text{ g}$$

**Q46 Text Solution:**

$$n_i = n_f (\text{CH}_3\text{OH})$$

$$\frac{0.8 \times v}{32 \times 10^{-3}} = 2.5 \times 0.25$$

$$V = 25 \times 10^{-3} \text{ L}$$

$$= 25 \text{ mL}$$

**Q47 Text Solution:**

$$M_1 V_1 = M_2 V_2$$

$$0.2 \times 100 = 0.15 \times V_2$$

$$V_2 = 133.33 \text{ mL}$$

$$\text{volume of H}_2\text{O required} = 133.33 - 100 = 33.33 \text{ mL}$$

**Q48 Text Solution:**

At STP, 5.6 L of gas = 11g

$\therefore$  22.4 L (1 mol) of gas = 44g (Molar mass)

**Q49 Text Solution:**

Mass of one molecule

$$= \frac{\text{molar mass}}{N_A}$$

$$= \frac{28}{N_A} \text{ g}$$

**Q50 Text Solution:**

$$n_C = \frac{81.82}{12} = 6.82$$

$$n_H = \frac{100 - 81.82}{1} = 18.18$$

$$\therefore \frac{n_C}{n_H} = \frac{6.82}{18.18} = \frac{1}{2.66} = \frac{3}{8}$$

$$\therefore \text{empirical formula} = \text{C}_3\text{H}_8$$





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