

Some Basic Concepts of Chemistry — NEET Chemistry

PYQ (2007-2020)

Class 11 Chemistry · 20 real NEET & AIPMT questions, year-tagged · answers checked by RankUp

NEET 2020 · Q123

1. Which one of the followings has maximum number of atoms ?

- (A) 1 g of Ag(s) [Atomic mass of Ag = 108]
- (B) 1 g of Mg(s) [Atomic mass of Mg = 24]
- (C) 1 g of O₂(g) [Atomic mass of O = 16]
- (D) 1 g of Li(s) [Atomic mass of Li = 7]

NEET 2019 · Q68

2. The number of moles of hydrogen molecules required to produce 20 moles of ammonia through Haber's process is:

- (A) 10
- (B) 20
- (C) 30
- (D) 40

NEET 2018 · Q57

3. A mixture of 2.3 g formic acid and 4.5 g oxalic acid is treated with conc. H₂SO₄. The evolved gaseous mixture is passed through KOH pellets. Weight (in g) of the remaining product at STP will be

- (A) 2.8
- (B) 3.0
- (C) 1.4
- (D) 4.4

NEET 2018 · Q78

4. In which case is the number of molecules of water maximum?

- (A) 0.00224 L of water vapours at 1 atm and 273 K
- (B) 0.18 g of water
- (C) 18 mL of water
- (D) 10⁻³ mol of water

NEET 2017 (Gujarati paper) · Q15

5. A hydrocarbon contains 85.7% C. If 42 mg of the compound contains 3.01×10^{20} molecules, the molecular formula of the compound will be:

- (A) C₃H₆
- (B) C₆H₁₂
- (C) C₁₂H₂₄
- (D) C₂H₄

NEET 2016 Phase 2 · Q59

6. Suppose the elements X and Y combine to form two compounds XY₂ and X₃Y₂. When 0.1 mole of XY₂ weighs 10 g and 0.05 mole of X₃Y₂ weighs 9 g, the atomic weights of X and Y are

- (A) 40, 30
- (B) 60, 40
- (C) 20, 30
- (D) 30, 20

AIPMT 2015

7. A mixture of gases contains H_2 and O_2 gases in the ratio of 1 : 4 (w/w). What is the molar ratio of the two gases in the mixture?

- (A) 2 : 1
- (B) 1 : 4
- (C) 4 : 1
- (D) 16 : 1

AIPMT 2014

8. 1.0 g of magnesium is burnt with 0.56 g O_2 in a closed vessel. Which reactant is left in excess and how much? (At. wt. Mg = 24; O = 16)

- (A) O_2 , 0.16 g
- (B) Mg, 0.44 g
- (C) O_2 , 0.28 g
- (D) Mg, 0.16 g

AIPMT 2014

9. When 22.4 litres of $\text{H}_2(\text{g})$ is mixed with 11.2 litres of $\text{Cl}_2(\text{g})$, each at S.T.P., the moles of $\text{HCl}(\text{g})$ formed is equal to:

- (A) 2 mol of $\text{HCl}(\text{g})$
- (B) 0.5 mol of $\text{HCl}(\text{g})$
- (C) 1.5 mol of $\text{HCl}(\text{g})$
- (D) 1 mol of $\text{HCl}(\text{g})$

NEET 2013

10. How many grams of concentrated nitric acid solution should be used to prepare 250 mL of 2.0 M HNO_3 ? The concentrated acid is 70% HNO_3 .

- (A) 45.0 g conc. HNO_3
- (B) 90.0 g conc. HNO_3
- (C) 70.0 g conc. HNO_3
- (D) 54.0 g conc. HNO_3

AIPMT 2011 Mains

11. Which has the maximum number of molecules among the following?

- (A) 8 g H_2
- (B) 64 g SO_2
- (C) 44 g CO_2
- (D) 48 g O_3

AIPMT 2010 Prelims · Q52

12. 25.3 g of sodium carbonate, Na_2CO_3 is dissolved in enough water to make 250 mL of solution. If sodium carbonate dissociates completely, molar concentration of sodium ion, Na^+ and carbonate ions, CO_3^{2-} are respectively (Molar mass of Na_2CO_3 = 106 g mol^{-1})

- (A) 0.477 M and 0.477 M
- (B) 0.955 M and 1.910 M
- (C) 1.910 M and 0.955 M
- (D) 1.90 M and 1.910 M

AIPMT 2010 Prelims · Q73

13. The number of atoms in 0.1 mol of a triatomic gas is ($N_A = 6.02 \times 10^{23} \text{ mol}^{-1}$)

- (A) 1.800×10^{22}
- (B) 6.026×10^{22}
- (C) 1.806×10^{23}
- (D) 3.600×10^{23}

AIPMT 2009 Prelims · Q192

14. 10 g of hydrogen and 64 g of oxygen were filled in a steel vessel and exploded. Amount of water produced in this reaction will be:

- (A) 3 mol
- (B) 4 mol
- (C) 1 mol
- (D) 2 mol

AIPMT 2008 Prelims · Q59

15. What volume of oxygen gas (O_2) measured at $0^\circ C$ and 1 atm, is needed to burn completely 1 L of propane gas (C_3H_8) measured under the same conditions?

- (A) 10 L
- (B) 7 L
- (C) 6 L
- (D) 5 L

AIPMT 2008 Prelims · Q72

16. How many moles of lead (II) chloride will be formed from a reaction between 6.5 g of PbO and 3.2 g of HCl ?

- (A) 0.029
- (B) 0.044
- (C) 0.333
- (D) 0.011

AIPMT 2008 Prelims · Q74

17. Volume occupied by one molecule of water (density = 1 g cm^{-3}) is

- (A) $5.5 \times 10^{-23} \text{ cm}^3$
- (B) $9.0 \times 10^{-23} \text{ cm}^3$
- (C) $6.023 \times 10^{-23} \text{ cm}^3$
- (D) $3.0 \times 10^{-23} \text{ cm}^3$

AIPMT 2008 Prelims · Q95

18. An organic compound contains carbon, hydrogen and oxygen. Its elemental analysis gave C, 38.71% and H, 9.67%. The empirical formula of the compound would be

- (A) CH_4O
- (B) CH_3O
- (C) CH_2O
- (D) CHO

AIPMT 2007 Prelims · Q65

19. Concentrated aqueous sulphuric acid is 98% H_2SO_4 by mass and has a density of 1.80 g mL^{-1} . Volume of acid required to make one litre of 0.1 M H_2SO_4 solution is

- (A) 16.65 mL
- (B) 22.20 mL
- (C) 5.55 mL
- (D) 11.10 mL

AIPMT 2007 Prelims · Q95

20. An element, X has the following isotopic composition:

$^{200}X : 90\%$, $^{199}X : 8.0\%$, $^{202}X : 2.0\%$

The weighted average atomic mass of the naturally occurring element X is closest to

- (A) 201 amu
- (B) 202 amu
- (C) 199 amu
- (D) 200 amu

Answer key and explanations

1. Answer: (D) 1 g of Li(s) [Atomic mass of Li = 7]

Moles of atoms: Ag $1/108$, Mg $1/24$, O_2 gives $2 \times 1/32 = 1/16$, and Li $1/7$. The largest is $1/7$ mol, so 1 g of lithium has the most atoms. For O_2 one must count two atoms per molecule, but even then it is less than lithium.

2. Answer: (C) 30

$N_2 + 3H_2 \rightarrow 2NH_3$: 3 mol H_2 give 2 mol NH_3 , so 20 mol NH_3 need $20 \times 3/2 = 30$ mol H_2 . 10 mol is the N_2 requirement.

3. Answer: (A) 2.8

$HCOOH$ ($2.3/46 = 0.05$ mol) $\rightarrow CO + H_2O$; $H_2C_2O_4$ ($4.5/90 = 0.05$ mol) $\rightarrow CO + CO_2 + H_2O$. KOH absorbs CO_2 (and water), leaving 0.1 mol $CO = 0.1 \times 28 = 2.8$ g. 4.4 g would be the CO_2 mass if it were wrongly counted.

4. Answer: (C) 18 mL of water

18 mL of liquid water (density 1 g/mL) is 18 g = 1 mol. The others are 10^{-4} mol (0.00224 L of vapour at STP), 0.01 mol (0.18 g) and 10^{-3} mol, so 18 mL has the most molecules.

5. Answer: (B) C_6H_{12}

Moles = $3.01 \times 10^{20} / 6.02 \times 10^{23} = 5 \times 10^{-4}$ mol, so molar mass = 0.042 g / 5×10^{-4} mol = 84 g mol $^{-1}$. 85.7% C corresponds to the empirical formula CH_2 (14 g mol $^{-1}$), and $84/14 = 6$ gives C_6H_{12} . All options have 85.7% C, so only the molar mass separates them.

6. Answer: (A) 40, 30

Molar masses: $XY_2 = 10/0.1 = 100$ and $X_3Y_2 = 9/0.05 = 180$. So $X + 2Y = 100$ and $3X + 2Y = 180$; subtracting gives $2X = 80$, $X = 40$ and $Y = 30$. The pair 30, 20 fails the first equation ($30 + 40 = 70$).

7. Answer: (C) 4 : 1

Take 1 g H_2 and 4 g O_2 : moles = $1/2 = 0.5$ and $4/32 = 0.125$. Mole ratio $0.5 : 0.125 = 4 : 1$. 1 : 4 is just the mass ratio.

8. Answer: (D) Mg, 0.16 g

$2Mg + O_2 \rightarrow 2MgO$. 0.56 g $O_2 = 0.0175$ mol, which needs 0.035 mol Mg = 0.84 g, while 1.0 g Mg is available, so O_2 is limiting. Mg left over = $1.0 - 0.84 = 0.16$ g.

9. Answer: (D) 1 mol of HCl(g)

$H_2 + Cl_2 \rightarrow 2HCl$. 22.4 L $H_2 = 1$ mol and 11.2 L $Cl_2 = 0.5$ mol, so Cl_2 is limiting and gives $2 \times 0.5 = 1$ mol HCl, not 2 mol.

10. Answer: (A) 45.0 g conc. HNO_3

Moles of $HNO_3 = 2.0 \times 0.250 = 0.50$ mol = $0.50 \times 63 = 31.5$ g. The 70% solution needed = $31.5/0.70 = 45.0$ g. 90 g comes from doubling the moles.

11. Answer: (A) 8 g H_2

Moles: 8 g $H_2 = 8/2 = 4$ mol; 64 g SO_2 , 44 g CO_2 and 48 g O_3 are each 1 mol. The largest number of moles means the most molecules, so 8 g of H_2 has the most, even though it has the smallest mass.

12. Answer: (C) 1.910 M and 0.955 M

Moles = $25.3/106 = 0.2387$ mol in 0.250 L, so $[Na_2CO_3] = 0.955$ M. Each formula unit gives 2 Na^+ and 1 CO_3^{2-} , so $[Na^+] = 1.910$ M and $[CO_3^{2-}] = 0.955$ M. The reversed pair swaps the ions.

13. Answer: (C) 1.806×10^{23}

0.1 mol of molecules $\times 3$ atoms $\times 6.02 \times 10^{23} = 1.806 \times 10^{23}$ atoms. 6.02×10^{22} is the number of molecules, not atoms.

14. Answer: (B) 4 mol

$2H_2 + O_2 \rightarrow 2H_2O$. 10 g $H_2 = 5$ mol and 64 g $O_2 = 2$ mol; 2 mol O_2 needs only 4 mol H_2 , so O_2 is limiting and gives 4 mol of water. Taking H_2 as limiting would wrongly give 5 mol.

15. Answer: (D) 5 L

$C_3H_8 + 5O_2 \rightarrow 3CO_2 + 4H_2O$. At the same temperature and pressure, volumes are in the same ratio as moles, so 1 L of propane needs 5 L of O_2 . 7 L comes from adding the volumes of the products, which is not what the question asks.

16. Answer: (A) 0.029

$PbO + 2HCl \rightarrow PbCl_2 + H_2O$. Moles of $PbO = 6.5/223 \approx 0.029$, and of $HCl = 3.2/36.5 \approx 0.088$, more than the 0.058 needed. PbO is the limiting reagent, so 0.029 mol $PbCl_2$ forms. 0.044 would wrongly treat HCl as limiting ($0.088/2$).

17. Answer: (D) 3.0×10^{-23} cm ^{3}

One mole of water (18 g) occupies 18 cm ^{3} at density 1 g cm $^{-3}$. Volume per molecule = $18/(6.022 \times 10^{23}) \approx 3.0 \times 10^{-23}$ cm ^{3} . 6.023×10^{-23} cm ^{3} just reuses the digits of Avogadro's number.

18. Answer: (B) CH₃O

O = 100 – 38.71 – 9.67 = 51.62%. Moles: C = 38.71/12 = 3.23, H = 9.67/1 = 9.67, O = 51.62/16 = 3.23, a ratio of 1 : 3 : 1, so the empirical formula is CH₃O. CH₄O (methanol) would need about 12.5% H.

19. Answer: (C) 5.55 mL

Molarity of the concentrated acid = (98/98) mol per 100 g × 1.80 g/mL × 1000/100 = 18.0 M. V = (0.1 × 1000)/18.0 = 5.55 mL. 11.10 mL would result from treating the acid as 9 M.

20. Answer: (D) 200 amu

Average mass = 200 × 0.90 + 199 × 0.08 + 202 × 0.02 = 180 + 15.92 + 4.04 = 199.96 ≈ 200 amu. 201 amu would be a simple average of the three masses.

Questions as set in the AIPMT/NEET papers conducted by CBSE and NTA. Answers checked and explanations written by the RankUp team. RankUp is not affiliated with CBSE or NTA.