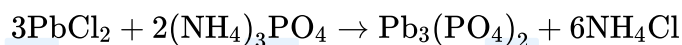


Questions with Answer Keys

MathonGo

Q1 - 2024 (01 Feb Shift 1)

Consider the following reaction:



If 72mmol of PbCl_2 is mixed with 50mmol of $(\text{NH}_4)_3\text{PO}_4$, then amount of $\text{Pb}_3(\text{PO}_4)_2$ formed is _____ mmol. (nearest integer)

Q2 - 2024 (01 Feb Shift 2)

10 mL of gaseous hydrocarbon on combustion gives 40 mL of CO_2 (g) and 50 mL of water vapour. Total number of carbon and hydrogen atoms in the hydrocarbon is _____.

Q3 - 2024 (27 Jan Shift 1)

Mass of methane required to produce 22 g of CO_2 after complete combustion is _____ g.

(Given Molar mass in g mol^{-1}

$$C = 12.0$$

$$H = 1.0$$

$$O = 16.0$$

Q4 - 2024 (27 Jan Shift 2)

Volume of 3MNaOH (formula weight 40 g mol^{-1}) which can be prepared from 84 g of NaOH is _____ $\times 10^{-1} \text{ dm}^3$.

Q5 - 2024 (27 Jan Shift 2)

1 mole of PbS is oxidised by " X " moles of O_3 to get " Y " moles of O_2 . $X + Y =$ _____

Q6 - 2024 (27 Jan Shift 2)

9.3 g of aniline is subjected to reaction with excess of acetic anhydride to prepare acetanilide. The mass of acetanilide produced if the reaction is 100% completed is _____ $\times 10^{-1}$ g. (Given molar mass in g mol^{-1} N : 14, O : 16, C : 12, H : 1)

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Questions with Answer Keys

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Q7 - 2024 (30 Jan Shift 1)

0.05 cm thick coating of silver is deposited on a plate of 0.05 m^2 area. The number of silver atoms deposited on plate are _____ $\times 10^{23}$. (At mass $\text{Ag} = 108$, $d = 7.9 \text{ g cm}^{-3}$)

Q8 - 2024 (31 Jan Shift 1)

Number of moles of methane required to produce $22 \text{ g CO}_2(\text{g})$ after combustion is $x \times 10^{-2}$ moles. The value of x is

Q9 - 2024 (31 Jan Shift 2)

A sample of CaCO_3 and MgCO_3 weighed 2.21 g is ignited to constant weight of 1.152 g . The composition of mixture is :

(Given molar mass in gmol^{-1} $\text{CaCO}_3 : 100$, $\text{MgCO}_3 : 84$)

(1) $1.187 \text{ gCaCO}_3 + 1.023 \text{ gMgCO}_3$

(2) $1.023 \text{ gCaCO}_3 + 1.023 \text{ gMgCO}_3$

(3) $1.187 \text{ gCaCO}_3 + 1.187 \text{ gMgCO}_3$

(4) $1.023 \text{ gCaCO}_3 + 1.187 \text{ gMgCO}_3$

Q10 - 2024 (31 Jan Shift 2)

The molarity of 1 L orthophosphoric acid (H_3PO_4) having 70% purity by weight (specific gravity 1.54 g cm^{-3}) is _____ M .

(Molar mass of $\text{H}_3\text{PO}_4 = 98 \text{ g mol}^{-1}$)

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Questions with Answer Keys

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Answer Key

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Q1 (24) /// mathongo **Q2** (14) /// mathongo **Q3** (8) /// mathongo **Q4** (7) /// mathongo

Q5 (8) /// mathongo **Q6** (135) /// mathongo **Q7** (11) /// mathongo **Q8** (50) /// mathongo

Q9 (1) /// mathongo **Q10** (11) /// mathongo /// mathongo /// mathongo /// mathongo

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Solutions

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Q1

Limiting Reagent is PbCl_2 mmol of $\text{Pb}_3(\text{PO}_4)_2$ formed

$$= \frac{\text{mmol of PbCl}_2 \text{ reacted}}{3}$$

$$= 24 \text{ mmol}$$

Q2

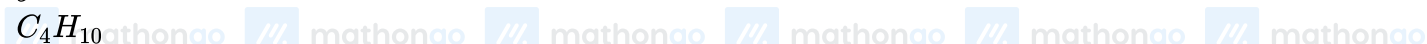


$$10x = 40$$

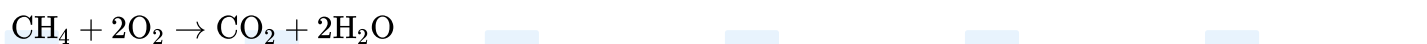
$$x = 4$$

$$5y = 50$$

$$y = 10$$



Q3



$$\text{Moles of CO}_2 = \frac{22}{44} = 0.5$$

So, required moles of $\text{CH}_4 = 0.5$

$$\text{Mass} = 0.5 \times 16 = 8 \text{ gm}$$

Q4

$$M = \frac{n_{\text{NaOH}}}{V_{\text{sol}} (\text{in L})} \Rightarrow 3 = \frac{(84/40)}{V} \Rightarrow V = 0.7 \text{ L} = 7 \times 10^{-1} \text{ L}$$

Q5



$$x = 4, y = 4$$

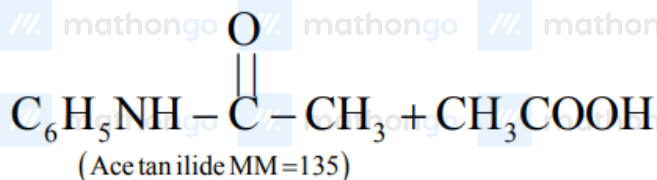
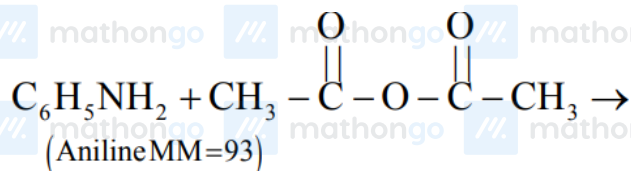
Q6

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Solutions

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$$\begin{aligned} n_{\text{Acetanilide}} &= n_{\text{Aniline}} \\ \Rightarrow \frac{m}{135} &= \frac{9.3}{93} \\ \Rightarrow m &= 13.5 \text{ g} \end{aligned}$$

Q7

$$\text{Volume of silver coating} = 0.05 \times 0.05 \times 10000 = 25 \text{ cm}^3$$

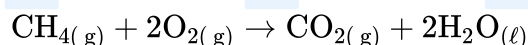
$$\text{Mass of silver deposited} = 25 \times 7.9 \text{ g}$$

$$\text{Moles of silver atoms} = \frac{25 \times 7.9}{108}$$

$$\text{Number of silver atoms} = \frac{25 \times 7.9}{108} \times 6.023 \times 10^{23} = 11.01 \times 10^{23}$$

Ans. 11

Q8



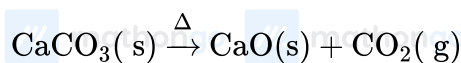
$$n_{\text{CO}_2} = \frac{22}{44} = 0.5 \text{ moles}$$

$$\text{So moles of CH}_4 \text{ required} = 0.5 \text{ moles}$$

$$\text{i.e. } 50 \times 10^{-2} \text{ mole}$$

$$x = 50$$

Q9

Let the weight of CaCO_3 be x gm

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Solutions

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$$\therefore \text{weight of MgCO}_3 = (2.21 - x) \text{ gm}$$

Moles of CaCO_3 decomposed = moles of CaO formed

$$\frac{x}{100} = \text{moles of CaO formed}$$

$$\therefore \text{weight of CaO formed} = \frac{x}{100} \times 56$$

Moles of MgCO_3 decomposed = moles of MgO formed

$$\frac{(2.21-x)}{84} = \text{moles of MgO formed}$$

$$\therefore \text{weight of MgO formed} = \frac{2.21-x}{84} \times 40$$

$$\Rightarrow \frac{2.21-x}{84} \times 40 + \frac{x}{100} \times 56 = 1.152$$

$$\therefore x = 1.1886 \text{ g} = \text{weight of CaCO}_3$$

$$\& \text{ weight of MgCO}_3 = 1.0214 \text{ g}$$

Q10

$$\text{Specific gravity (density)} = 1.54 \text{ g/cc.}$$

$$\text{Volume} = 1 \text{ L} = 1000 \text{ ml}$$

$$\text{Mass of solution} = 1.54 \times 1000$$

$$= 1540 \text{ g}$$

% purity of H_2SO_4 is 70%

$$\text{So weight of H}_3\text{PO}_4 = 0.7 \times 1540 = 1078 \text{ g}$$

$$\text{Mole of H}_3\text{PO}_4 = \frac{1078}{98} = 11$$

$$\text{Molarity} = \frac{11}{1 \text{ L}} = 11$$

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