2.7 Moles, Formulae and Reacting Mass Calculations: 10-minute Pack

Total Marks

EDEXCEL 4CH1 · Calculator allowed · about 10 minutes

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 A student writes the formula Na_2CO_3 for sodium carbonate. How many atoms are represented in one formula unit of Na_2CO_3?

(Total for Question 1 is 1 mark)

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2 Calculate the mass of calcium sulfide, CaS, that would be formed when 5.00 g of calcium reacts with excess sulfur according to the equation Ca + S -> CaS. Use Ar: Ca = 40, S = 32 and show your working.

(Total for Question 2 is 2 marks)

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3 A laboratory uses 0.10 mol of carbon dioxide, CO_2, in a reaction. Calculate the mass of this amount of carbon dioxide. Use Ar: C = 12 and O = 16.

(Total for Question 3 is 1 mark)

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4 Determine the mass of 0.25 mol of sodium chloride, NaCl. Use Ar: Na = 23, Cl = 35.5 and show your working.

(Total for Question 4 is 2 marks)

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5 A compound contains 2.4 g of iron and 0.8 g of oxygen. Deduce the empirical formula of the compound. Use Ar: Fe = 56, O = 16 and show your working.

(Total for Question 5 is 3 marks)

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Mark scheme · 2.7 Moles, Formulae and Reacting Mass Calculations: 10-minute Pack

Question 1

6 atoms: 2 Na + 1 C + 3 O **B1**

Answer: 6 atoms

Question 2

calculates moles Ca = 5.00 / 40 = 0.125 mol and uses 1:1 mole ratio so moles CaS = 0.125 **M1**

mass CaS = moles x Mr = 0.125 x (40 + 32) = 0.125 x 72 = 9.00 g cao **A1**

Answer: 9.00 g CaS

Question 3

mass = moles x Mr = 0.10 x (12 + 2 x 16) = 4.4 g cao **B1**

Answer: 4.4 g CO_2

Question 4

calculates Mr(NaCl) = 23 + 35.5 = 58.5 **M1**

mass = moles x Mr = 0.25 x 58.5 = 14.625 g, cao (allow 14.6 g) **A1**

Answer: 14.6 g (to 3 s.f.) or 14.625 g

Question 5

converts masses to moles: n(Fe) = 2.4 / 56 = 0.04286; n(O) = 0.8 / 16 = 0.05 **M1**

divides by smallest mole: Fe ratio = 0.04286/0.04286 = 1; O ratio = 0.05/0.04286 = 1.1667 (or 7/6) **M1**

scales to whole numbers: multiply ratios by 6 to get Fe_6O_7, empirical formula = Fe_6O_7 cao **A1**

Answer: Empirical formula Fe_6O_7

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