

## Design & Technology

# Mathematics for D&T – Ratio

### Materials required for questions

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- Pencil
- Rubber
- Calculator

### Instructions

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- Use black ink or ball-point pen
- Try answer all questions
- Use the space provided to answer questions
- Calculators can be used if necessary

### Advice

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- Marks for each question are in brackets
- Read each question fully
- Try to answer every question
- Don't spend too much time on one question

## Good luck!

**Q1.** A screwdriver has a volume of  $32,000\text{mm}^3$ . The handle is formed of 2 materials:

Material	Density	Percentage of handle
A	$1.3\text{g/mm}^3$	70%
B	$1.5\text{g/mm}^3$	30%

Calculate the mass of the handle in grams **(4 marks)**

**Q2.** A manufacturer is producing a concrete mix for a new building. The building requires 4 concrete beams, each  $1.2\text{m} \times 2\text{m} \times 5\text{m}$ . The cement is mixed with water in a 2:4 water to cement ratio. How much water is needed for the building? **(4 marks)**

**Q3.** A plank of wood is to be cut in a ratio of 2:1:5. The plank is 2m long. Calculate the length of the longest piece **(2 marks)**

**Q4.** The ratio of resin to hardener for an adhesive is 4:5. If the volume of hardener is  $4\text{cm}^3$ . What is the total volume of the adhesive when mixed **(3 marks)**

**Q5.** Copper costs £4 per kg. Zinc costs £3.10 per kg. Copper and zinc are mixed in the ratio 4:1 to make brass. Work out the cost of 7 kilograms of brass. **(3 marks)**

**Q6.** A bag contains nuts and bolts in the ratio 1:3 There are 8 more bolts than nuts. How many nuts are there **(3 marks)**

## **Answers**

**Q1.**

43,520 grams

**Q2.**

Volume =  $48\text{m}^3$

Water needed =  $16\text{m}^3$

**Q3.**

1.25m

**Q4.**

$7.2\text{cm}^3$

**Q5.**

1.4kg Copper x 4 = 5.6

5.6kg Zinc x 3.10 = 17.36

Total = £22.99

**Q6.**

4 nuts and 12 bolts