**Design & Technology**

**Mathematics for D&T –** Ratio

**Materials required for questions**

* Pencil
* Rubber
* Calculator

**Instructions**

* 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**

* 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 32,000mm3. The handle is formed of 2 materials:

|  |  |  |
| --- | --- | --- |
| Material | Density | Percentage of handle |
| A | 1.3g/mm3 | 70% |
| B | 1.5g/mm3 | 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 1.2m x 2m x 5m. 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 4cm3. 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 = 48m3

Water needed = 16m3

**Q3.**

1.25m

**Q4.**

7.2cm3

**Q5.**

5.6kg Copper x 4 = 22.4

1.4kg Zinc x 3.10 = 4.34

Total = £26.74

**Q6.**

4 nuts and 12 bolts