Answers

Task 1

1. Carbon fibre is a very strong composite material made from thermoset polymer and carbon fibres. It is used to make bike frames, car chassis and running blades.

A bike frame design has a mass of 1.75 kg. If the ratio of polymer to carbon fibre is   
3 : 4, calculate the mass of polymer and carbon fibre are needed to manufacture 100   
bike frames.

|  |  |
| --- | --- |
| **Polymer:** | **Carbon fibre:** |
| 3 + 4 = 7  kg  0.25 × 3 = **0.75 kg** | 1.75 – 0.75 = **1 kg**  Or 3 + 4 = 7  kg  0.25 × 4 = **1 kg** |

2. Epoxy resin is a thermoset adhesive which is made by adding a resin to a hardener. Study the design of the epoxy resin dispenser below and estimate the ratio of resin to hardener being dispensed.

**1 : 1**

A close up of a device

Description generated with high confidence

3. A particular type of stainless steel contains iron, nickel and chromium in the ratio of   
47 : 35 : 18 by mass.

How much iron, nickel and chromium are present in 20.0 kg of stainless steel?

47 + 35 + 18 = 100 parts

Iron: × 20 = **9.4 kg**, nickel × 20 = **7 kg**, chromium, × 20 = **3.6 kg**

Task 2

1. Calculate the following:

(a) A student makes a wooden chair in which of the total cost is teak and of the cost is pine. The remaining costs were made up of components and finishes.

If the total cost of the chair was £52.50, work out the cost of the teak and the cost of the pine to the nearest penny.

Cost of teak = x £52.50 = **£13.13**

Cost of pine = x £52.50 = **£17.50**

(b) The average car engine weighs 158 kg.

The ratio of the mass of the engine to the mass of the car is 1 : 11.

What is the mass of the car?

158 x 11 = **1738 kg**

2. In a school, there are 40 students studying GCSE Design and Technology this year.  
The number of students studying GCSE Design and Technology this year is an increase of on the numbers studying the course the previous year.

How many students studied the course the previous year?

Let *N* = the number of students **last** year.

Number of students **this** year = number of students **last** year + of the students **last** year.  
  
40 = *N* + *N*  
  
40 = *N*  
  
40 x = **32 students**