

**Q1.**

A student wanted to determine the density of a small piece of rock.

- (a) Describe how the student could measure the volume of the piece of rock.

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**(4)**

- (b) The volume of the piece of rock was 18.0 cm<sup>3</sup>.

The student measured the mass of the piece of rock as 48.6 g.

Calculate the density of the rock in g/cm<sup>3</sup>.

Use the equation:

$$\text{density} = \frac{\text{mass}}{\text{volume}}$$

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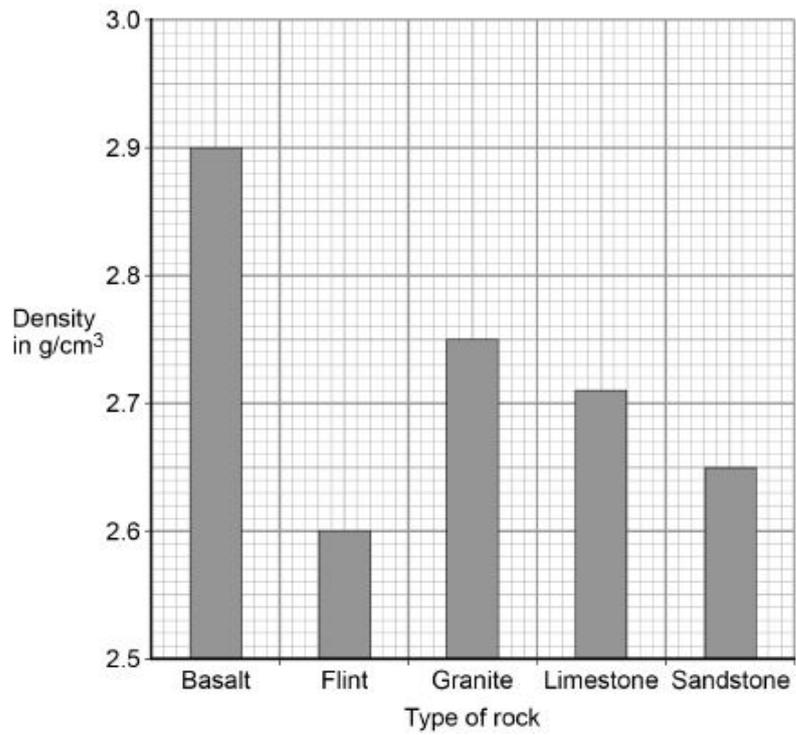
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Density = \_\_\_\_\_ g/cm<sup>3</sup>

**(2)**

The graph below shows the densities of different types of rock.



(c) What is the most likely type of rock that the student had?

Tick **one** box.

- Basalt
- Flint
- Granite
- Limestone
- Sandstone

(1)

(d) Give **one** source of error that may have occurred when the student measured the volume of the rock.

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(1)

(e) How would the error you described in part (d) affect the measured volume of the rock?

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(1)  
(Total 9 marks)

## Mark schemes

### Q1.

- (a) **Level 2:** The method would lead to the production of a valid outcome. Key steps are identified and logically sequenced. 3-4

**Level 1:** The method would not necessarily lead to a valid outcome. Some relevant steps are identified, but links are not made clear. 1-2

**No relevant content** 0

#### Indicative content

- part fill a measuring cylinder with water
- measure initial volume
- place object in water
- measure final volume
- volume of object = final volume – initial volume
  
- fill a displacement / eureka can with water
- water level with spout
- place object in water
- collect displaced water
- measuring cylinder used to determine volume of displaced water

(b)  $\text{density} = \frac{48.6}{18.0}$  1

density = 2.70 (g/cm<sup>3</sup>) 1

*an answer of 2.70 (g/cm<sup>3</sup>) scores 2 marks*

- (c) limestone 1

- (d) eye position when using measuring cylinder  
**or**  
water level in can (at start) not at level of spout  
**or**  
not all water displaced by stone is collected in container 1

- (e) volume would be lower / higher 1

**[9]**