

## Mark schemes

## Q1.

- (a) **Level 3:** A judgement, strongly linked and logically supported by a sufficient range of correct reasons, is given.

5–6

**Level 2:** Some logically linked reasons are given. There may also be a simple judgement.

3–4

**Level 1:** Relevant points are made. They are not logically linked.

1–2

**No relevant content**

0

**Indicative content****raw materials**

- crude oil is finite
- quarrying / mining pollute the environment
- glass uses more energy to process raw materials

**manufacturing**

- glass uses more energy to make bottles
- glass is heavier so takes more energy to transport

**use and operation**

- glass bottles are reusable
- reuse of glass conserves (natural) resources
- reuse of glass consumes energy during washing
- reuse of glass consumes water during washing

**disposal**

- both glass and polymer bottles can be recycled
- recycling polymer conserves finite resources
- recycling glass and polymer uses less energy than making new glass and polymer
- both methods reduce use of landfill

**other points**

- energy needed may be derived from fossil fuels
- use of fossil fuels causes (specified) pollution
- total energy for glass (bottle) (7500 kJ) is greater than total energy for polymer (bottle) (1800 kJ)

**reasoned judgement**

- (b) mass = density × volume

1

$$\text{mass} = 0.40 \times 40$$

1

$$= 16 \text{ (g)}$$

1

**[9]**