

PAT 2006

Section A

- 1 C
- 2 A
- 3 A
- 4 C
- 5 B
- 6 D
- 7 C
- 8 C
- 9 B
- 10 C

Section B

- 11 a dimmer
- b normal
- c normal
- d off
- e dimmer
- f normal
- g brighter
- h normal

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$$\rho_{\text{cubes}} = \frac{1}{2} \rho_{\text{liquid}}$$

$$r + g = 35 \text{ cm}$$

$$2g + b = 70 \text{ cm}$$

$$r + b = 2g$$

$$3g - b = 35$$

$$2g + b = 70$$

$$5g = 105$$

$$g = \underline{21 \text{ cm}}$$

$$b = \underline{28 \text{ cm}}$$

$$r = \underline{14 \text{ cm}}$$

$$\rho_{\text{cubes}} (r^3 + g^3 + b^3) = 20 \text{ kg}$$

$$\rho_{\text{liquid}} = \frac{2 \times 20}{(0.21)^3 + (0.28)^3 + (0.14)^3} = \underline{\underline{1180 \text{ kg/m}^3}}$$

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a) No longer accelerating, run out of fuel

b) Just before running out of fuel, as it is lightest

c) Decelerating at a steady rate (due to friction)

d) Area under graph