

Name of the Student: _____

Max. Marks : 17 Marks

Time :17 Minutes

Mark Schemes

Q1.

(a) 1 (cm³) 1

(b) pressure is inversely proportional to volume 1

data to prove inversely proportional relationship

$$\text{eg } 8 \times 200 = 1600$$

$$\text{and } 10 \times 160 = 1600$$

*if no other marks score allow for 1 mark: as volume decreases
pressure increases*

2

(c) (as the gas is compressed) the volume of gas decreases 1

(so there are) more frequent collisions of gas particles with container walls

1

(and) each particle collision with the wall causes a force 1

(so there is a) greater force on walls 1

[8]

Q2.

(a) $1.2 = \frac{m}{2.3 \times 10^4}$ 1

$m = 1.2 \times 2.3 \times 10^4$ 1

$m = 27\,600$ (kg)

allow an answer of 28 000 (kg) or 2.8×10^4 (kg)

or

$m = 2.76 \times 10^4$ (kg) 1

an answer of 27 600 (kg) scores 3 marks

- (b) mass of air passing the turbine blades is halved which decreases kinetic energy by a factor of two

1

(wind speed is halved) decreasing kinetic energy by a factor of four

1

so kinetic energy decreases by a factor of eight

1

allow power output for kinetic energy throughout

- (c) $388\,000 = 0.5 \times 13\,800 \times v^2$

this mark may be awarded if P is incorrectly / not converted

1

$$v^2 = \frac{(2 \times 388\,000)}{13\,800}$$

this mark may be awarded if P is incorrectly / not converted

or

$$v^2 = \frac{388\,000}{(0.5 \times 13\,800)}$$

or

$$v^2 = 56.2$$

1

$$v = 7.50 \text{ (m/s)}$$

an answer that rounds to 7.50 (m/s) only

1

[9]