Name of the Student:_____
Max. Marks : 18 Marks **Time : 18 Minutes**

Mark Schemes

Q1.

(a) risk of electric shock (if someone touched the case)

allow risk of electrocution (if someone touched the case)

1

(b) 2530 = I × 230

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

1

$$I = \frac{2530}{230}$$

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

1

I = 11 (A)

this answer only

*an answer of 0.011 (A) scores **2** marks*

1

*an answer of 11 (A) scores **3** marks*

(c) E = 2530 × 14

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

1

E = 35 420 (J)

this answer only

1

35 420 = m × 4200 × 70

allow their calculated E = m × 4200 × 70

1

$$m = \frac{35\,420}{4200 \times 70}$$

$$\text{allow } m = \frac{\text{their calculated } E}{4200 \times 70}$$

1

m = 0.12 (kg)

allow an answer that is consistent with their calculated value of E

1

[9]

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 (m/s)

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

1

[9]