Name of the Student:_____
Max. Marks : 24 Marks **Time : 24 Minutes**

Mark Schemes

Q1.

(a) E_p = 367 500 000 (J)

1

367 500 000 = 2 500 000 × 9.8 × *h*

allow a correct substitution using an incorrectly/not converted value of E_p

1

$$h = \frac{367\,500\,000}{2\,500\,000 \times 9.8}$$

allow a correct rearrangement using an incorrectly/not converted value of E_p

1

h = 15 (m)

allow an answer consistent with their value of E_p

1

(b) 3 kW = 3000 W

1

$$3000 = \frac{2.16 \times 10^7}{t}$$

all subsequent marks can score using an incorrectly / not converted value of P

1

$$t = \frac{2.16 \times 10^7}{3000}$$

1

t = 7200 (s)

1

$t = 7.2 \times 10^3$ (s)

allow an answer given in standard form from a calculation using data given in the question

1

(c) in the summer the power output from the hydroelectric generator is lower but the solar power output would be greater

*allow power output of hydroelectric generator depends on rainfall **and** power output of solar power system depends on light intensity*

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1

so less variation in total power output (which improves the reliability of the supply)

allow electricity supply for total power output

1

allow reference to specific months eg April to September

[11]

Q2.

(a) apply the force further away from the pivot

do not allow increase the length of the lever

1

(b) v = 15 (m/s)

1

24 000 = m × 15

allow a value of v = 14.5 (m/s)

1

$$m = \frac{24\,000}{15}$$

1

m = 1600 (kg)

1

(c) distance travelled during first 3 seconds = 22.5 (m)

1

distance travelled during last 2 seconds = 30 (m)

1

total distance = 52.5 (m)

allow 53 (m)

allow 1 mark for the correct addition of their calculated distances

allow a maximum of 2 marks for total distance = 50.75 (m) if velocity used = 14.5 (m/s)

1

(d) stopping distance includes thinking distance

allow stopping distance = braking distance + thinking distance

1

there is an additional time before the driver applies the brakes.

allow the driver's reaction time will increase (due to the distraction)

1

(so) the thinking distance will increase

1

(e) work is done due to friction (in the brakes)

ignore friction alone

1

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(causing) an increase in the internal / thermal energy (of the brakes)

1

[13]

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