Name of the Student:_____
Max. Marks : 17 Marks **Time : 17 Minutes**

Mark Schemes

Q1.

(a) the total energy of the racing track and the car is constant.

1

(b) $E_p = 0.040 \times 9.8 \times 0.90$

allow a correct substitution of an incorrectly/not converted value of h

1

$E_p = 0.3528$ (J)

this answer only

1

$0.3528 = 0.5 \times 0.040 \times v^2$

allow a correct substitution of a calculated E_p

1

$$v^2 = \frac{0.3528}{0.5 \times 0.040}$$

allow a correct rearrangement using a calculated E_p

1

v = 4.2 (m/s)

allow an answer consistent with their calculated E_p

1

(c) more than 0.20 J

1

(because) the car needs to be moving at the top of the loop
or
(because) the car needs to be moving to complete the loop
or
not all E_k at **B** will be transferred to E_p at **C**

this mark is dependent on scoring the first mark
allow energy dissipated to the surroundings

1

[8]

Q2.

(a) % increase = $\frac{(10\,000 - 3200)}{3200} \times 100$

1

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% increase = 212.5 (%)

1

(b) Any **two** from:

- no sulfur dioxide released
- doesn't cause acid rain
- no particulates released
- doesn't cause global dimming
- less carbon dioxide released (per kg of fuel burned)
- less global warming

  allow less climate change

  allow less greenhouse gases
- no solid waste
- gas mining is less destructive than coal mining

  ignore less air pollution

2

(c) mean sea surface temperature shows a (steady) increase

1

over the time period on the graph

conditional on scoring 1st marking point
allow between a correct pair of dates at least 10 years apart

or

from 16.45 (°C) to 16.96 (°C)

allow a correct pair of temperatures at least 10 years apart

1

(d) thermistor C

1

(because) the change in resistance is greatest

conditional on scoring 1st marking point
allow the gradient is highest
allow more sensitive to temperature change

1

between 0 and 25 ºC

conditional on scoring 2nd marking point
allow between 16 and 17 °C
if thermistor C is not chosen, allow for 1 mark each:
not thermistor A because there is no/little change in resistance
not thermistor B as there is only a small change in resistance
not thermistor D as there is no data available between 0 and 40 °C

1

[9]

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