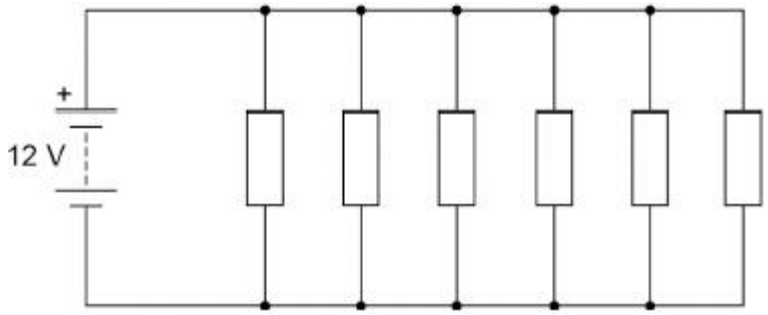
Name of the Student:_____

Max. Marks : 24 Marks **Time : 24 Minutes**

Q1.

The figure below shows an electrical circuit used to heat the windscreen of a car.

Each resistor in the circuit represents a heating element.



(a) The 12 V battery supplies direct potential difference.

What is meant by 'direct potential difference'?

_____

_____

_____

(1)

Use the Physics Equations Sheet to answer parts (b) and (c).

(b) Which equation links charge flow (*Q*), energy (*E*) and potential difference (*V*)?

Tick (✓) **one** box.

$E = \frac{V}{Q}$ ☐

$E = QV$ ☐

$E = \frac{Q}{V}$ ☐

$E = \frac{V^2}{Q}$ ☐

(1)

Downloaded from www.merit-minds.com

(c) Calculate the charge flow through the 12 V battery when the battery transfers 5010 J of energy.

Charge flow = _____ C

(3)

(d) Ice forms on the windscreen at a temperature of 0 °C.

The electrical circuit transfers 5010 J of energy to the ice.

A mass of 0.015 kg of ice melts.

Calculate the specific latent heat of fusion of water.

Use the Physics Equations Sheet.

Specific latent heat of fusion of water = _____ J/kg

(3)

(e) The electrical circuit was left switched on while the ice changed from a solid to a liquid and increased in temperature to 5 °C.

Explain the changes in the arrangement **and** movement of the particles as the ice melted and the temperature increased to 5 °C.

Downloaded from www.merit-minds.com

(6)

(Total 14 marks)

Q2.

The figure below shows a rock found by a student on a beach.

To help identify the type of rock, the student took measurements to determine its density.

(a) Describe a method the student could use to determine the density of the rock.

Downloaded from www.merit-minds.com

_____

_____

_____

(6)

The student determined the density of the rock to be 2.55 ± 0.10 g/cm^3.

(b) What are the maximum and minimum values for the density of the rock?

Maximum density = _____ g/cm^3

Minimum density = _____ g/cm^3

(1)

(c) The table below gives the density of five different types of rock.

Type of rock	**Density in g/cm^3**
Basalt	2.90 ± 0.10
Chalk	2.35 ± 0.15
Flint	2.60 ± 0.10
Sandstone	2.20 ± 0.20
Slate	2.90 ± 0.20

Which two types of rock in above table could be the type of rock the student had?

Tick (✓) **one** box.

Basalt or chalk ☐

Chalk or flint ☐

Flint or sandstone ☐

Sandstone or slate ☐

(1)

(d) The student only took one set of measurements to determine the density of the rock.

Explain why taking the measurements more than once may improve the accuracy of the density value.

_____

_____

_____

Downloaded from www.merit-minds.com

(2)
(Total 10 marks)

Downloaded from www.merit-minds.com