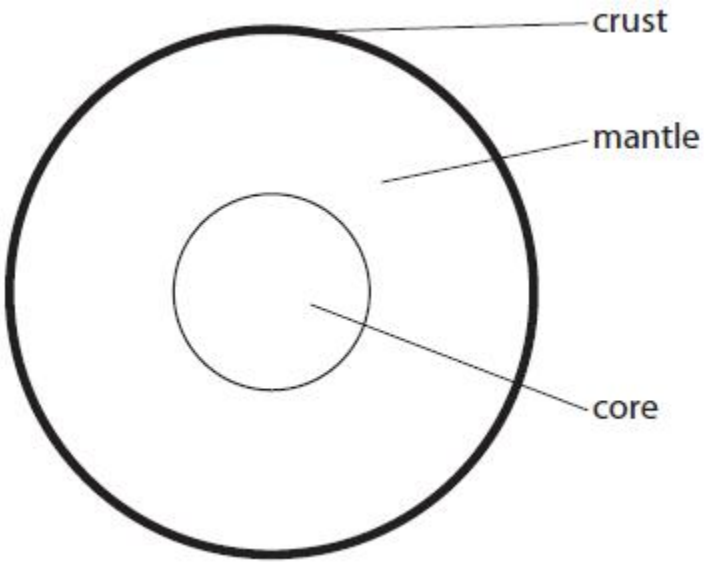
Name of the Student:_____
Max. Marks : 20 Marks **Time : 20 Minutes**

Q1.

The diagram shows a cross-section of the Earth.



The mantle is hotter near the core than near the crust.

(i) Complete the sentence by putting a cross (☒) in the box next to your answer.

One reason for the mantle being hotter near the core is that

(1)

- ☐ **A** the Earth's crust is a solid
- ☐ **B** the Earth's core is a liquid
- ☐ **C** the Earth is radiating heat to space
- ☐ **D** the Earth is absorbing heat from space

(ii) Explain how this temperature difference causes the tectonic plates in the Earth's crust to move.

(2)

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Q2.

The photograph shows an electric heater used to warm garages.



When the heater is switched on, it quickly warms up and then stays at a constant temperature.
Explain why the heater stays at a constant temperature.

(2)

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Q3.

(a) Here are some forms of energy:

chemical	elastic potential	electrical
heat (thermal)	kinetic	light
nuclear	sound	

(i) Use words from the box to complete the table.
Each word may be used once, more than once, or not at all.

The first one has been done for you.

(3)

device	energy transferred from...	energy is mostly transferred into...
electric motor	electrical	kinetic
bow and arrow	elastic potential	
electric kettle	electrical	
microphone		electrical

(ii) In the electric motor only some of the electrical energy is transferred into kinetic energy.

State what happens to the remaining electrical energy.

(1)

.....

(b) Many appliances are sold with an energy efficiency rating.

A-rated appliances are the most energy efficient.

Here is some information about two types of electric lamp.

	halogen lamp	compact fluorescent lamp (CFL)
energy efficiency rating	B	A
energy transfer diagrams (not drawn to scale)	energy transfer in one second electrical energy = 20 J → light energy = 2 J	energy transfer in one second electrical energy = 20 J → light energy = 8 J

(i) Calculate how much energy is wasted in one second by the compact fluorescent lamp (CFL).

(1)

.....

(ii) Use the energy transfer diagrams to explain why the CFL lamp has a better efficiency rating than the halogen lamp.

(2)

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(c) The photograph shows an electric heater used to warm garages.



When the heater is switched on, it quickly warms up and then stays at a constant temperature.
Explain why the heater stays at a constant temperature.

(2)

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(Total for Question is 9 marks)

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Q4.

The International Space Station (ISS) has several solar panels called wings.



(a) The wings convert energy from the Sun into a form useful in the ISS.

(1)

- ☒ **A** transverse and electromagnetic
- ☒ **B** electromagnetic but not transverse
- ☒ **C** transverse but not electromagnetic
- ☒ **D** neither transverse nor electromagnetic

(b) In one second, the useful energy available from one wing is 34.3 kJ.
The energy incident on the wing from the Sun is five times this amount.

What is the percentage efficiency of the wing?

(3)

efficiency = ... %

(c) A wing is in direct sunlight.
The ISS is not receiving energy from the wing.
The temperature of the wing remains constant.

Explain why the temperature of the wing remains constant in these conditions.

(2)

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