Questions are for separate science students only

Q1.

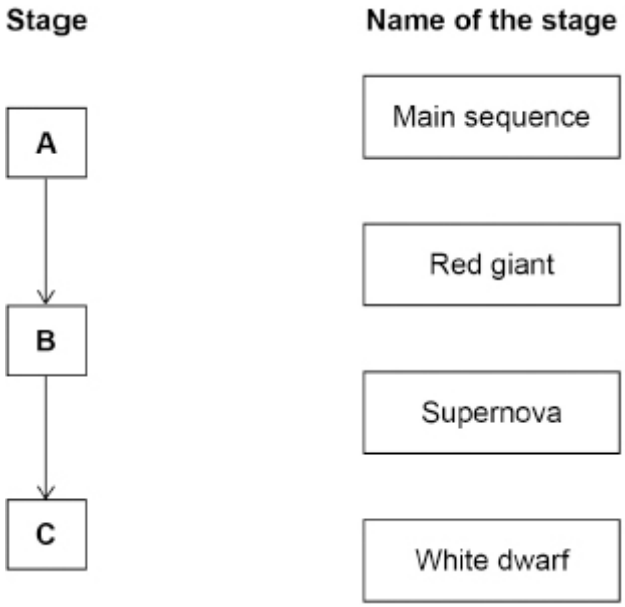
(a) All stars have a life cycle. **(Physics only)**

A, **B** and **C** in **Figure 3** represent three stages in the life cycle of the Sun.

The stages are in the correct order.

Draw **one** line from each stage to the name of the stage.

Figure 3



(2)

(b) Stars act like black bodies. **(Physics only)**

Which statement is true for perfect black bodies?

Tick (✓) **one** box.

They are good reflectors of radiation. ☐

They are the best emitters of radiation. ☐

They easily transmit radiation. ☐

(1)

(Total 3 marks)

Q2.

Infrared waves are transverse waves. **(Physics only)**

(a) Complete the sentence.

In a transverse wave, the direction of oscillation is _____

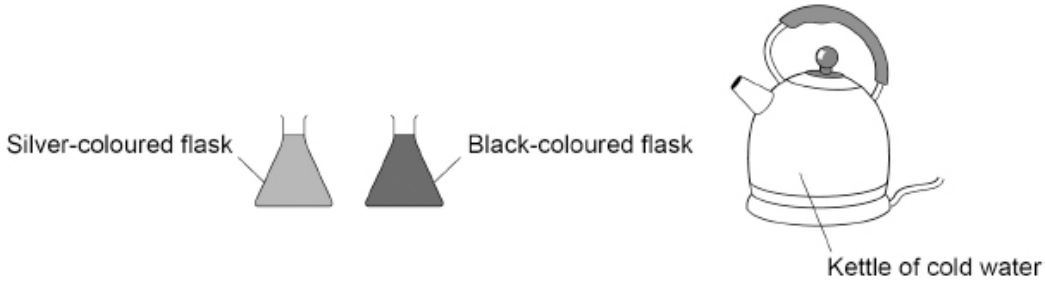
to the direction of energy transfer by the wave.

(1)

A student investigated how the colour of a surface affects the rate at which the surface emits infrared radiation.

Figure 1 shows some of the equipment used.

Figure 1



(b) The student wrote the following hypothesis:

'The black-coloured flask will emit more infrared radiation than the silver-coloured flask during 10 minutes of cooling.'

Describe a method to test this hypothesis.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

(6)

(c) When will the flasks emit infrared radiation at the greatest rate?

Give a reason for your answer.

Tick (✓) **one** box.

During the 1st minute ☐

During the 5th minute ☐

During the 9th minute ☐

Reason _____

_____

(2)

Another student investigated the absorption of infrared radiation by different surface colours.

The student filled four hollow metal cubes with cold water.

Each cube was the same size but had a different surface colour.

The cubes were then placed the same distance from an infrared heater.

After 10 minutes, the student measured the temperature increase of the water inside each cube.

(d) What was the dependent variable in this investigation?

_____

_____

(1)

(e) The table below shows the results.

Surface colour of the cube	**Temperature increase after 10 minutes in °C**
Matt white	3.0
Shiny white	2.0
Matt black	6.5
Shiny black	4.0

Give **two** conclusions that can be made from the results in the table above.

1 _____

_____

2 _____

_____

(2)

(Total 12 marks)