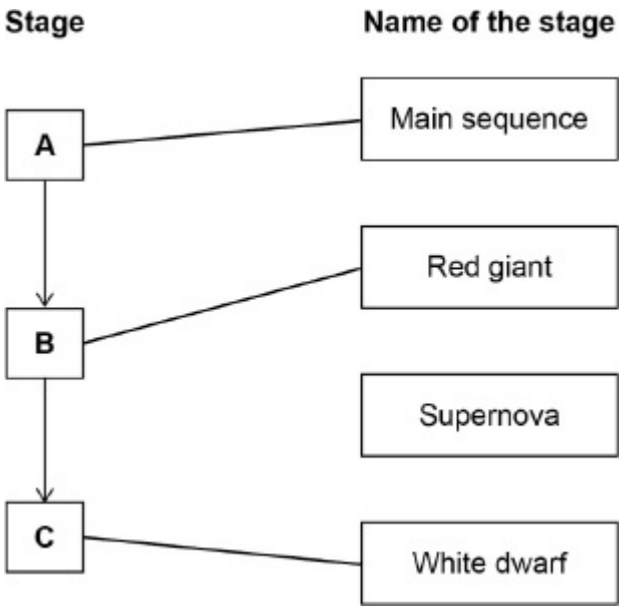
Mark schemes

Q1.

(a)



2 marks for all lines correct
1 mark for 2 lines correct

additional line from a box on the left negates the mark for that box

2

(b) they are the best emitters of radiation

1

[3]

Q2.

(a) perpendicular

1

(b) **Level 3:** The method would lead to the production of a valid outcome. The key steps are identified and logically sequenced.

5-6

Level 2: The method would not necessarily lead to a valid outcome. Most steps are identified, but the method is not fully logically sequenced.

3-4

Level 1: The method would not lead to a valid outcome. Some relevant steps are identified, but links are not made clear.

1-2

No relevant content

0

Indicative content

Method:

- heat the water / kettle
- add an equal volume of (hot) water to each flask
- insert a thermometer into each flask
- record the initial temperature from both flasks
  OR
- place an IR detector near each flask
- the distance between the IR detector and the flask should be the same each time
- record initial reading from IR detectors

- (and) start a stop clock
- record the temperatures / readings after 10 minutes from both flasks
- calculate the change in temperatures / readings during the 10 minutes

- compare the results to test the hypothesis

to access level 3 the method must allow the correct consideration of a temperature decrease for both flasks or the correct comparison of IR detected from both flasks

(c) during the 1st minute

1

there is the greatest temperature difference (between the hot water and the surroundings)

allow highest temperature or hottest

1

MP 2 dependent on scoring MP1

(d) the temperature (increase / change after 10 minutes)

allow the final temperature

do not allow temperature decrease

1

(e) black surfaces absorb more (infrared than white surfaces)

allow black surfaces have a greater temperature increase (than white surfaces)

1

matt surfaces absorb more (infrared) than shiny surfaces of the same colour

allow matt surfaces have a greater temperature increase than shiny surfaces of the same colour

if no other marks scored, allow 1 mark for matt black surface is the best absorber and shiny white surface is the worst absorber

if no other marks scored, allow 1 mark for matt black has the greatest temperature increase and shiny white has the smallest temperature increase

1

[12]