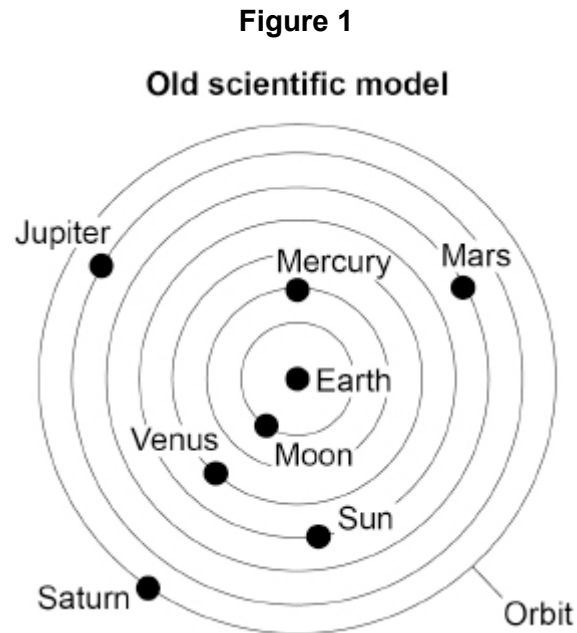**Questions are for separate science students only**

Q1.

Figure 1 shows an old scientific model of the solar system that has now been replaced. **(Physics only)**

Figure 1

Old scientific model

(a)   Which statement is a reason for replacing an old scientific model with a newer scientific model?

Tick (✓) **one** box.

The old model cannot explain new observations. ☐

The old model has been used by scientists for a long time. ☐

The old model is too simple. ☐

(1)

(b)   Compare the model of the solar system used now with the old model of the solar system shown in **Figure 1**.

_____

_____

_____

_____

_____

_____

_____

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_____

_____

_____

(4)

The table below shows data about four planets.

Planet	Mean distance from the Sun in millions of kilometres	Time taken for one orbit in Earth years
Mercury	58	0.25
Venus	108	0.60
Earth	150	1.00
Mars	228	1.90

(c)   How does the time taken for one orbit change as the mean distance from the Sun increases?

_____

_____

(1)

(d)   The bar chart in **Figure 2** shows some of the data from the table above.

Figure 2
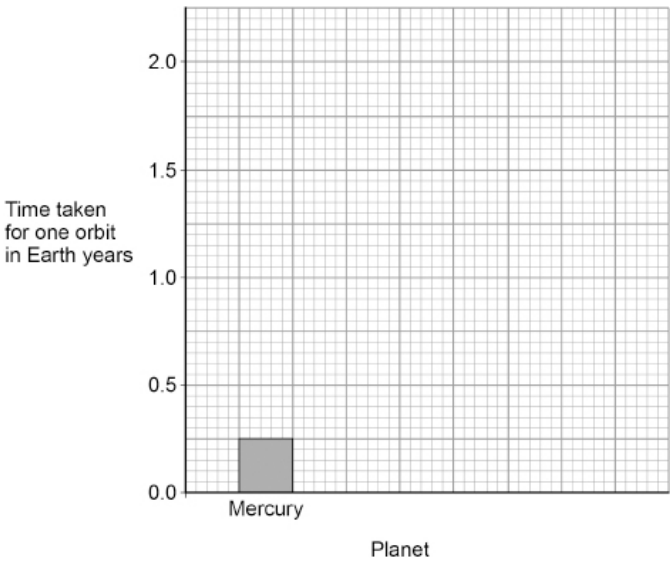
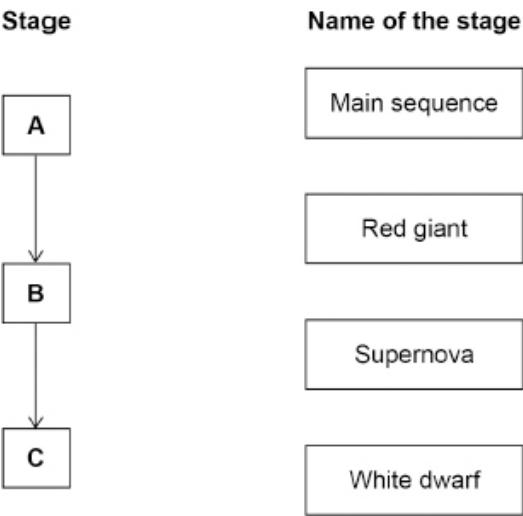
Complete the bar chart.

Use data from the table above.

(2)

(e)   All stars have a life cycle.

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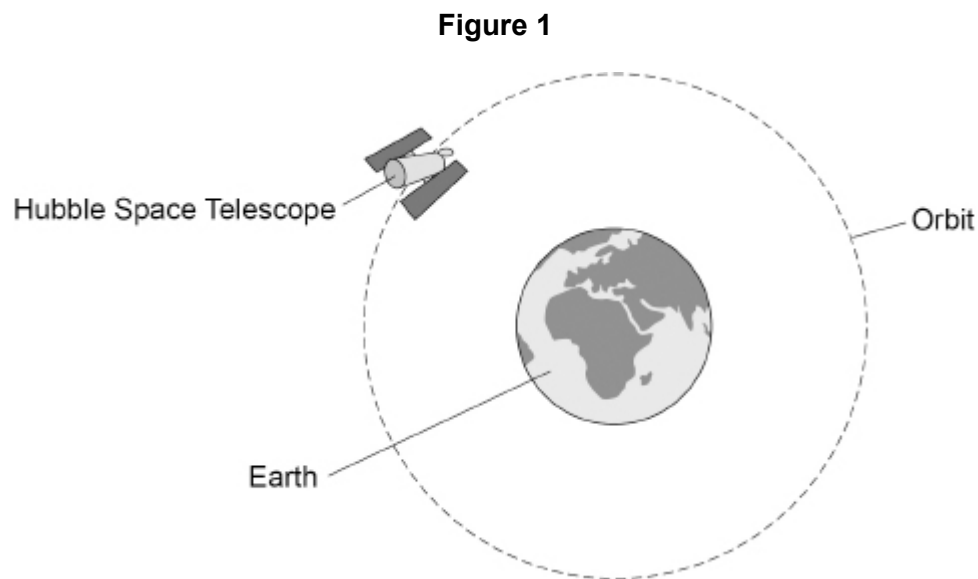
The stages are in the correct order.

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

Figure 3

(2)
(Total 10 marks)

Q2.

Figure 1 shows the Hubble Space Telescope orbiting the Earth. **(Physics only)**

Figure 1

(a)   What name is given to an object that orbits a planet?

Tick (✓) **one** box.

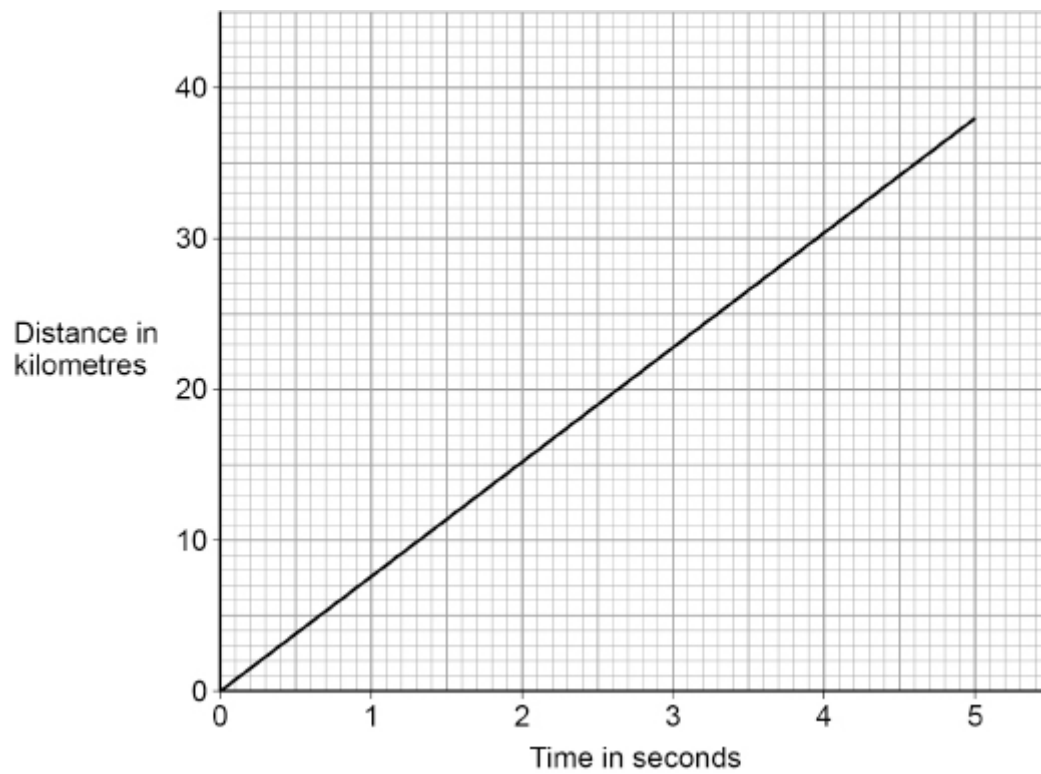A comet   ☐

A satellite   ☐

A star   ☐

(1)

(b)   The Earth exerts a gravitational force on the Hubble Space Telescope.

Draw an arrow on **Figure 1** to show the gravitational force.

(1)

(c) **Figure 2** shows how the distance travelled by the Hubble Space Telescope during its orbit changes with time.

Figure 2

The gradient of the line in **Figure 2** gives the speed of the Hubble Space Telescope.

Determine the speed of the Hubble Space Telescope.

Give your answer in km/s.

_____

_____

_____

_____

_____

Speed = _____ km/s

(3)

(Total 5 marks)

Q3.

The Sun is at the centre of our solar system. **(Physics only)**

(a)   What type of object is the Sun?

_____

(1)

(b)   What is the name of the galaxy our solar system is part of?

Tick (✓) **one** box.

Andromeda   ☐

Milky Way   ☐

Sombrero   ☐

Tadpole   ☐

(1)

The table below gives information about some of the moons in our solar system.

Moon	Radius in kilometres
Ganymede	2630
Titan	2570
Europa	1560
Charon	606

(c)   What is a moon?

_____

(1)

(d)   A student researched the radius of some planets in the solar system.

radius of largest dwarf planet = 1190 km
radius of smallest planet = 2440 km

The student made the following conclusions:

1. dwarf planets are always smaller than moons
2. planets are always bigger than moons.

Give **one** reason why each of the student's conclusions is wrong.

Use the data given above and in the table above.

1. _____

_____

2. _____

_____

(2)

The Earth's Moon and the International Space Station both orbit the Earth.

(e)   Give **one other** similarity and one difference between the orbit of the
Earth's Moon and the orbit of the International Space Station.

Similarity

_____

_____

Difference

_____

_____

(2)
(Total 7 marks)