

Exploring space

- 1 (a) The photograph shows an Apollo 12 astronaut walking on the Moon.



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

Manned space crafts have landed on the Moon but have not yet landed on Mars.

One of the reasons is because

(1)

- A** the Moon is closer to Earth than Mars
- B** the Moon is closer to the Sun than Mars
- C** Mars is closer to the Earth than the Moon
- D** Mars is closer to the Sun than the Moon

- (b) A scientist compares the sizes of some objects in space.

Which of these is the smallest?

Put a cross (☒) in the box next to your answer.

(1)

- A** Jupiter
- B** the Milky Way galaxy
- C** the Moon
- D** the Sun

(c) Some scientists look for signs of water on other planets.

Suggest why they do this.

(1)

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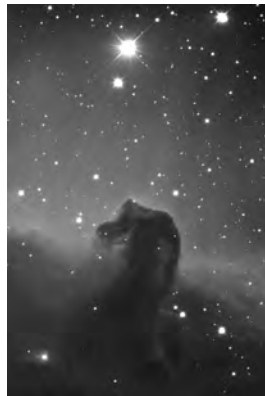
(d) The Earth is 150 000 000 km from the Sun.
It takes light 500 s to reach the Earth from the Sun.

Calculate the speed of light in km/s.

(3)

speed = km/s

(e) The photograph was taken using a powerful telescope on Earth.
It shows a nebula and many stars.



(i) Explain why photographs from telescopes in space show the nebula more clearly.

(2)

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- (ii) A nebula is a cloud of gas and dust where stars are formed.
A hot object forms when gas and dust in a nebula come together.

Explain why the gas and dust come together and form a hot object.

(2)

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(Total for Question 3 = 10 marks)

2 (a) The photograph shows a nebula and many stars.



(i) A nebula is a cloud of gas and dust from which stars are formed.

Describe the energy changes involved when a main sequence star forms from gas and dust.

(3)

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(ii) Describe how the mass of a main sequence star will affect what the star finally becomes.

(3)

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The Solar System

3 The diagram shows four moons which orbit Jupiter.



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

Jupiter is

(1)

- A** a comet
- B** a galaxy
- C** a planet
- D** a universe

(ii) Galileo used a new invention to observe these moons.

The invention he used was called a

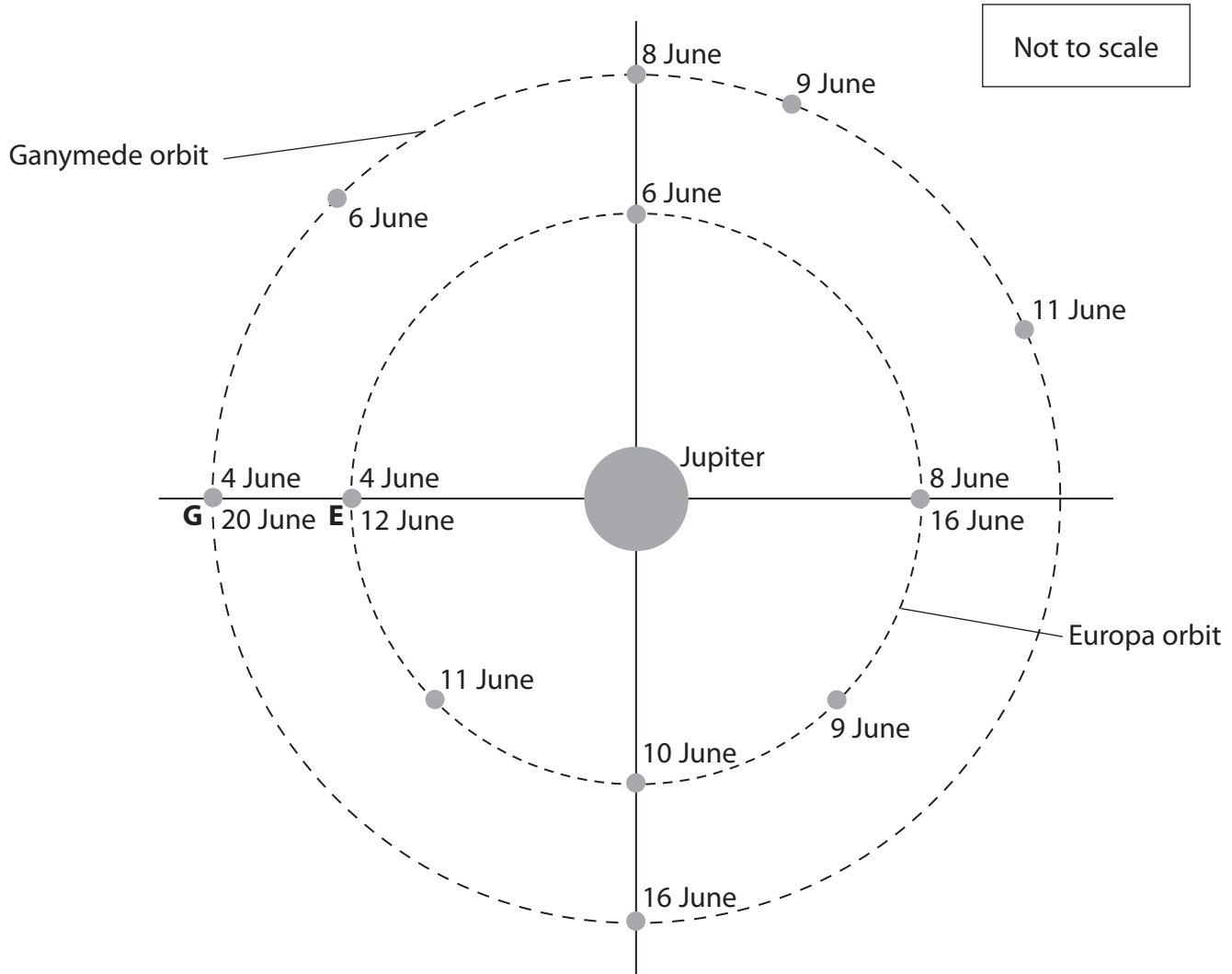
(1)

(b) The diagram shows Jupiter.

d

The radius of Europa's orbit is 671 000 km.

The radius of Ganymede's orbit is 1 070 000 km.



The positions of the moons on some dates are marked.

(i) On which one of the marked dates were the moons closest together?

(1)

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(ii) Use information from the diagram to calculate the time for Ganymede to complete one orbit of Jupiter.

(1)

time for one orbit = days

(iii) Calculate the distance from Europa to Ganymede on 12 June.

(2)

distance apart = km

*(iv) Describe how the distance between Europa and Ganymede changes during three orbits of Europa.

(6)

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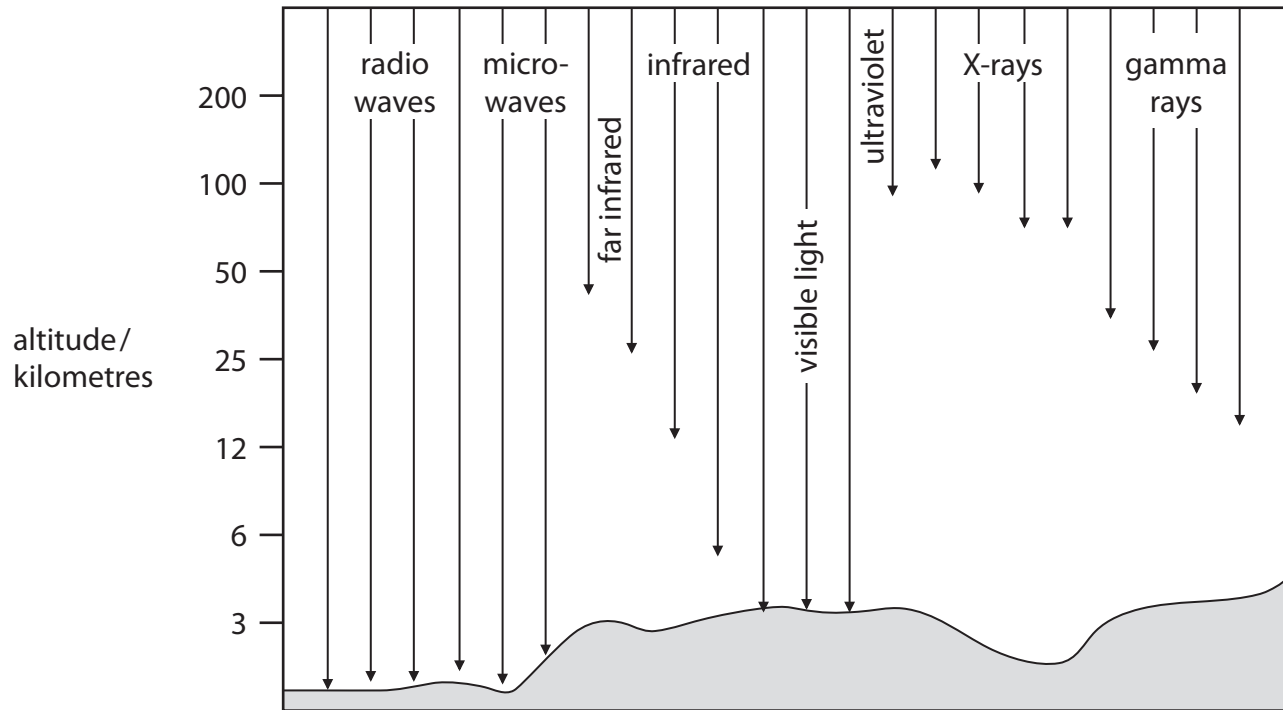
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(Total for Question 6 = 12 marks)

The Solar System

- 4 Not all electromagnetic radiation coming from space reaches the Earth's surface.

The diagram shows how far radiation from each part of the electromagnetic spectrum travels down through the atmosphere.



- (a) (i) Name **one** type of radiation that can reach the surface of the Earth from stars.

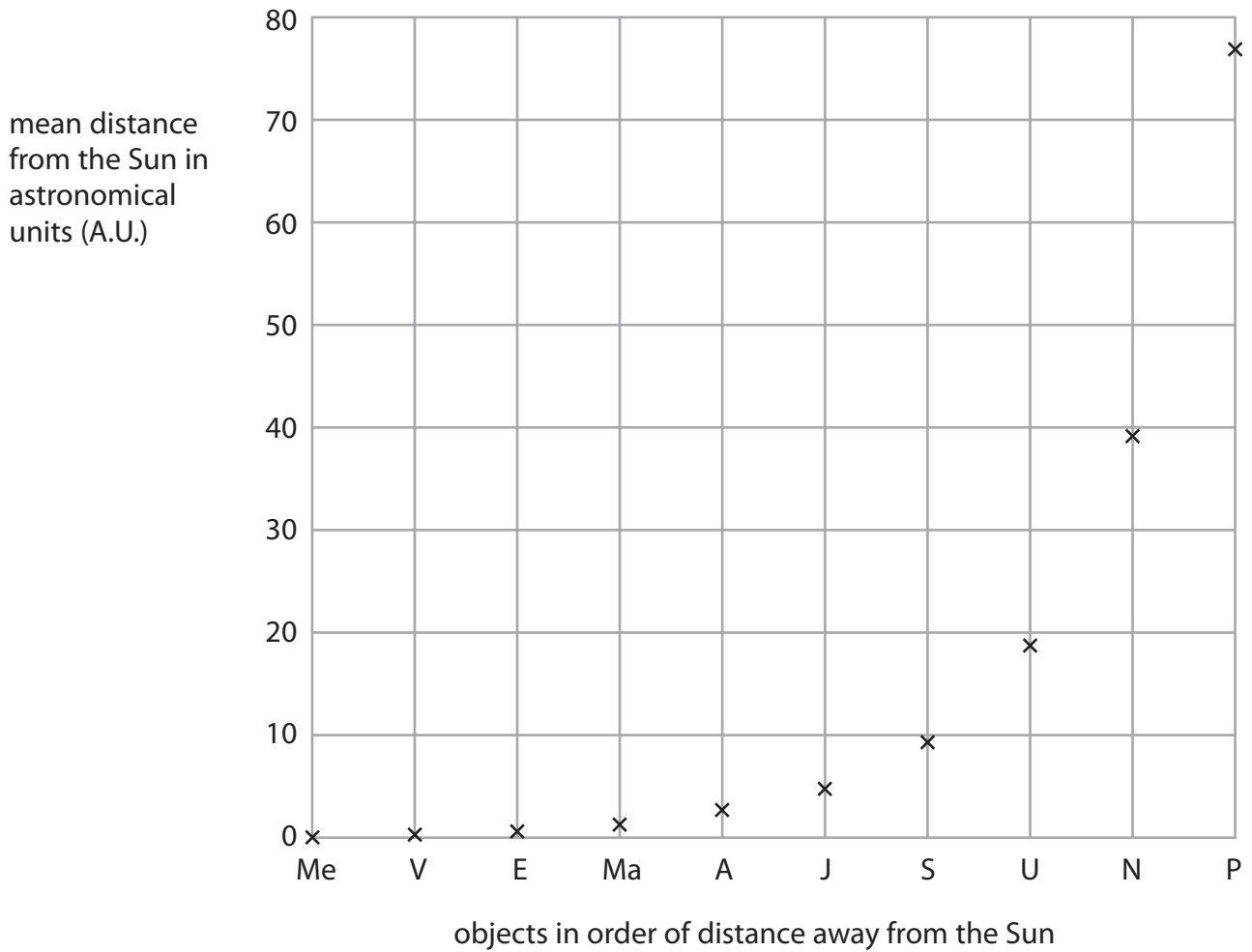
(1)

- (ii) Name **one** type of radiation from stars that cannot be detected at the Earth's surface but can be detected using satellites.

(1)

(b) Bode, a scientist, found a rule predicting the distance of objects from the Sun.

The chart shows the mean distances from the Sun predicted by Bode's rule.



[Me – Mercury; V – Venus; E – Earth; Ma – Mars; A – Asteroid Belt; J – Jupiter; S – Saturn; U – Uranus; N – Neptune; P – Pluto]

(i) Read, from the chart, the predicted values for the distance from the Sun to Neptune and from the Sun to Pluto.

(2)

Sun to Neptune.....

Sun to Pluto.....

