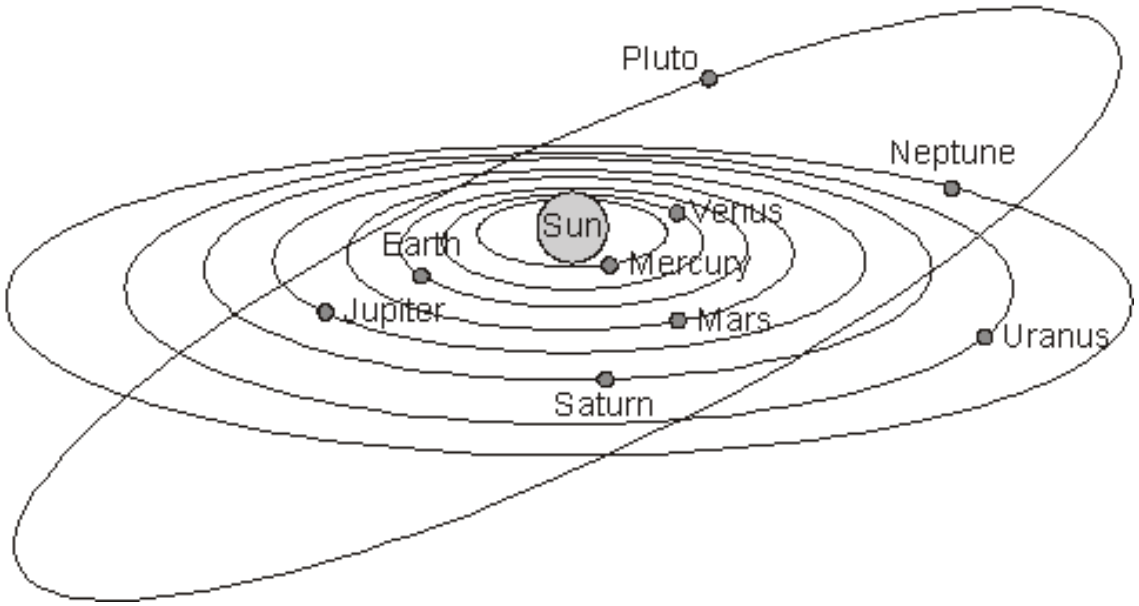
Explore Further Questions
Case Study 1, 7.3 Escape Earth

Question 1

Pluto was discovered in 1930. It was classified as a planet.
In 2006, scientists agreed that Pluto is **not** a planet.

(a) The diagram below shows our solar system.



not to scale

(i) **From the diagram**, what supports the idea that Pluto is a planet?

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1 mark

(ii) **From the diagram**, what supports the idea that Pluto is **not** a planet?

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1 mark

(b) The table below shows information about planets in our solar system.

planet	diameter (km)
Mercury	4800
Venus	12200
Earth	12800
Mars	6800
Jupiter	142600
Saturn	120200
Uranus	49000
Neptune	50000

Pluto has a diameter of 2300 km. How does this information suggest to scientists that Pluto is **not** a planet?

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1 mark

(c) An object called Charon orbits Pluto. How does the presence of Charon support the idea that Pluto is a planet?

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1 mark

(d) The table below shows the composition of the atmosphere of some of the objects in our solar system.

object	atmosphere
Mercury	none
Venus	mainly carbon dioxide
Earth	mainly nitrogen and oxygen
Neptune	hydrogen, helium and methane
Earth's moon	none
Titan (a moon)	nitrogen and methane
Pluto	nitrogen and methane

Atmosphere is **not** used to classify objects as moons or planets.
Use the information above to suggest a reason for this.

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1 mark

(e) Why do you think scientists found it difficult to decide how Pluto should be classified?

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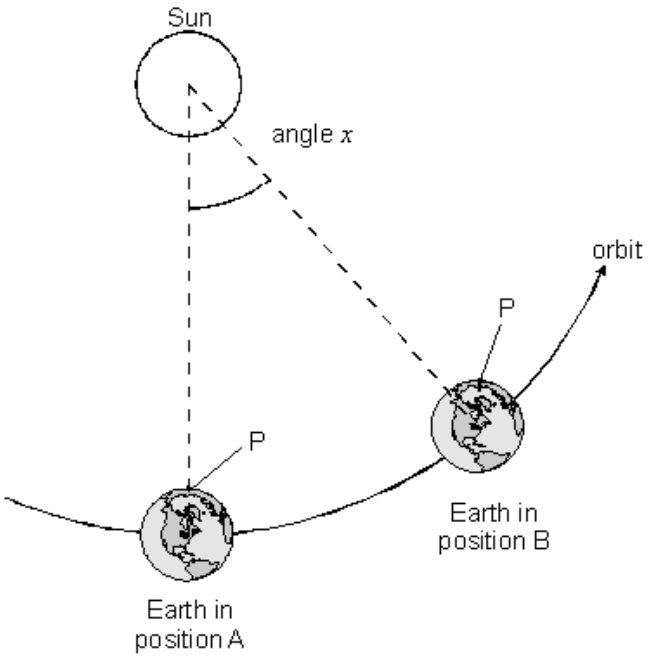
1 mark
maximum 6 marks

Question 2

The diagram shows the Earth in two positions in its orbit around the Sun, one day apart. The diagram is **not** to scale.



At position A, the Sun is vertically above the point P on the Earth. At position B, the Earth has rotated a full 360° on its axis. It has to rotate a little further before the Sun is again vertically above point P.

(a) The diagram is **not** drawn to scale, and the angle x has been drawn too large. Through what angle x, to the nearest degree, does the Earth move in its orbit in one day?

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1 mark

(b) For the Sun to be in the same place in the sky (vertically above point P) the Earth has to rotate (360 + x)°. This takes exactly 24 hours. How long does it take for the Earth to rotate through 360°? Give the unit.

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1 mark

(c) One year is approximately 365.25 Earth days. Calculate how many times the Earth actually rotates during one year.

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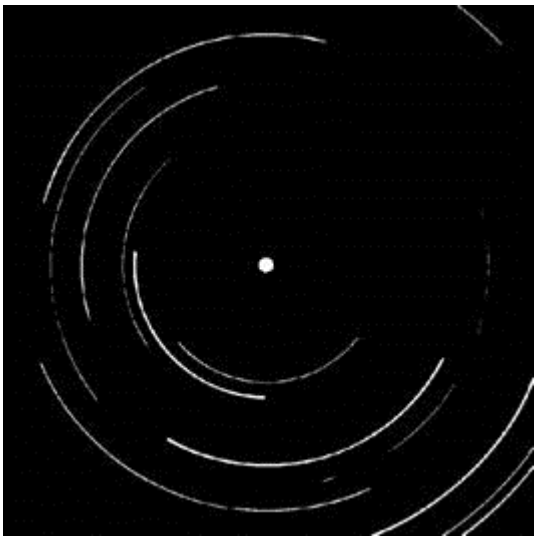
1 mark
Maximum 3 marks

Question 3

On a clear night, a camera was set up on a fixed stand pointing at the Pole Star. The camera shutter was opened and kept open for a number of hours. The diagram shows the paths of a number of stars appearing in the photograph.



(a) (i) In the photograph, most of the stars appear as curved lines instead of dots. Why do the stars appear as curved lines?

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1 mark

(ii) The Pole Star appears as a bright dot in the middle, not as a curved line. Why does the Pole Star appear as a dot?

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1 mark

(b) Study the diagram carefully. For how long was the camera shutter kept open?

..... hours

1 mark
Maximum 3 marks