

GCSE Physics B (Twenty First Century Science)
J259/04 Depth in physics (Higher Tier)

Question Set 18

1

Astronomers use telescopes in space to observe the Universe.

(a) The Kepler telescope has been used to detect planets around distant stars.

It orbits around the Sun in a circular orbit, as shown in **Fig. 9.1**.

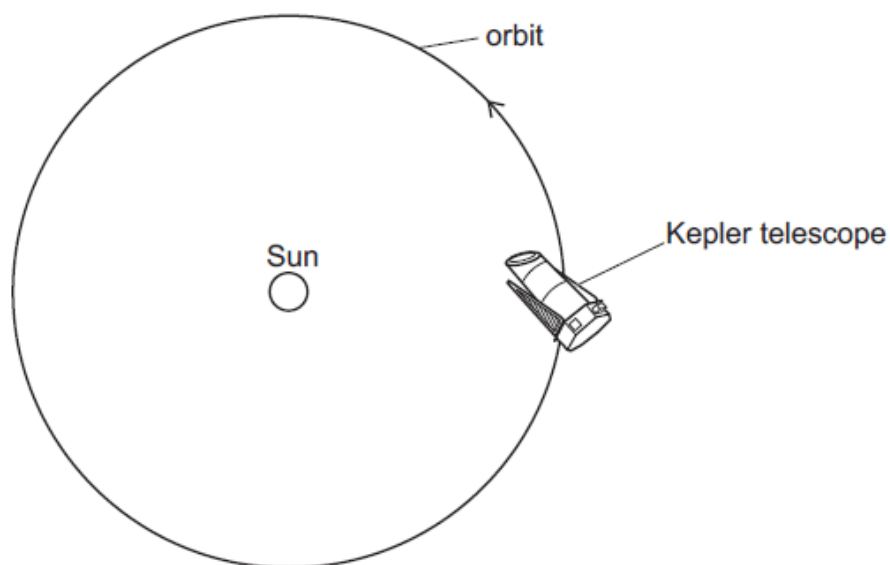


Fig. 9.1

Ben makes the following comment.

Ben

In its orbit, the speed and velocity of the Kepler telescope remains the same.

The force on the Kepler telescope is in the direction of the velocity.



Is Ben correct?

Explain your answer.

[2]

(b) The Hubble Space Telescope discovered the Baby Boom Galaxy, where one star is formed every two hours.

(i) Explain how a star is initially formed.

Use ideas from the particle model in your answer.

[2]

(ii) Explain the evidence for the 'Big Bang' model of the Universe.

[2]

(c) The Hubble Space Telescope was launched from the surface of the Earth using a reusable rocket (Space Shuttle).

Fig. 9.2 shows the typical forces acting on a rocket during lift-off.

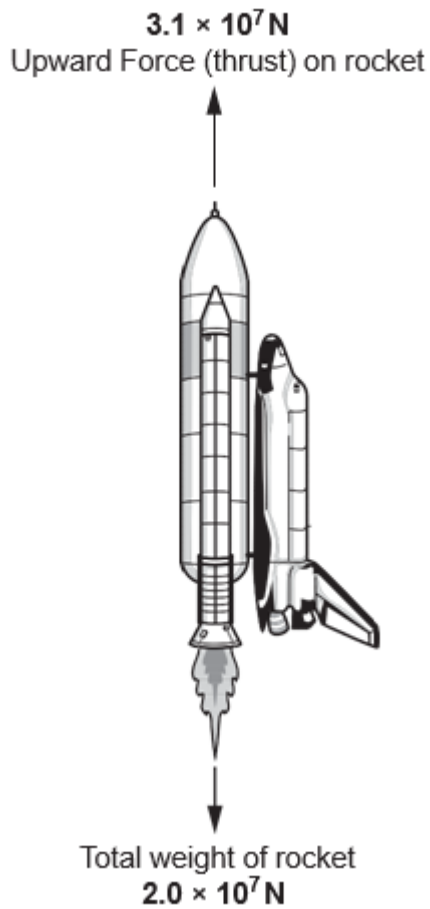


Fig. 9.2

The total mass of the rocket is $2.0 \times 10^6 \text{ kg}$.

Calculate the acceleration of the rocket during lift-off.

Acceleration = m/s^2

[4]

Total Marks for Question Set 18: 10

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