

GCSE Physics A (Gateway)
J249/04 Physics A P5-P8 and P9 (Higher Tier)

Question Set 21

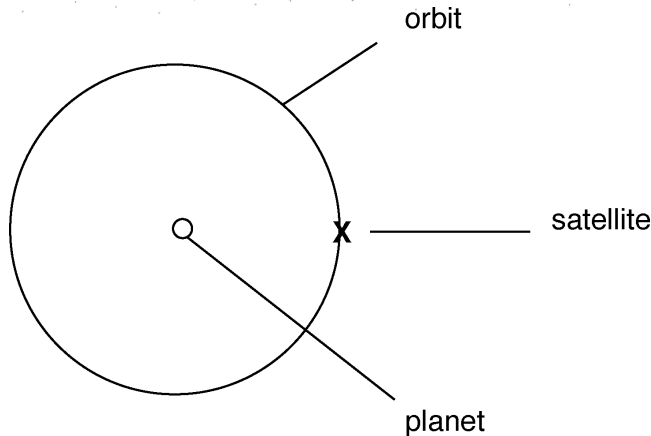
21 (a) State **two** features of a satellite in a **polar orbit**?

Suggest a use for a satellite in a polar orbit.

- Take the satellites over the Earth's poles.
- The satellites travel very close to the Earth \therefore travel at very high speeds (≈ 8000 m/s)
- Used for monitoring the weather, spying and taking images of the Earth's surface.

[3]

(b) An artificial satellite (X) is kept in a stable circular orbit around a planet by a centripetal force caused by gravity.



(i) Explain how the velocity of a satellite is constantly changing whilst its speed remains the same when it is in orbit.

The direction of the satellite is constantly changing
 \therefore the velocity of the satellite is constantly changing.
This is because velocity is a vector (magnitude AND direction). [2]

(ii) The satellite is remotely controlled from Earth.

The scientists want the satellite to move slower.

$$\frac{GM}{r^2} = \frac{v^2}{r}$$

What effect will this change in speed have on the height of its orbit?

Explain your answer.

The satellite would 'fall' to a lower orbit as gravitational attraction will be too strong and the satellite will fall towards the Earth. [2]

Total Marks for Question Set 21: 7

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