11 This question is about satellites and their orbits.

(a) (i) State a difference between an artificial satellite's orbit and a planet's orbit.

(1)

.....

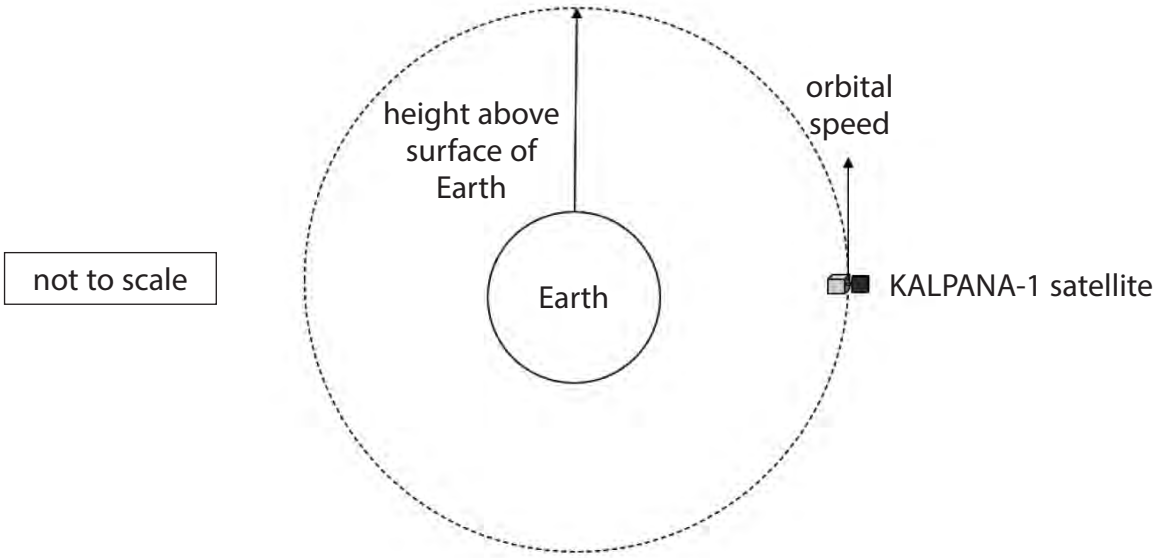
(ii) State a similarity between an artificial satellite's orbit and a moon's orbit.

(1)

.....

(b) KALPANA-1 was an artificial satellite used to monitor the weather.

(i) The diagram shows the orbit of the satellite.



KALPANA-1 has an orbital speed of 3.1 km/s and completes one orbit in 24 hours.

Calculate the height of KALPANA-1's orbit above the Earth's surface.

[radius of Earth = 6400 km]

(4)

height above surface = ... km

(ii) The Doppler effect occurs when there is relative motion between the source of waves and the observer of the waves.

Explain how the Doppler effect causes a change in the observed frequency of the waves.

(3)

(iii) Suggest why the radio waves from KALPANA-1 detected on the Earth's surface are **not** affected by the Doppler effect.

(2)

(Total for Question 11 = 11 marks)

TOTAL FOR PAPER = 110 MARKS