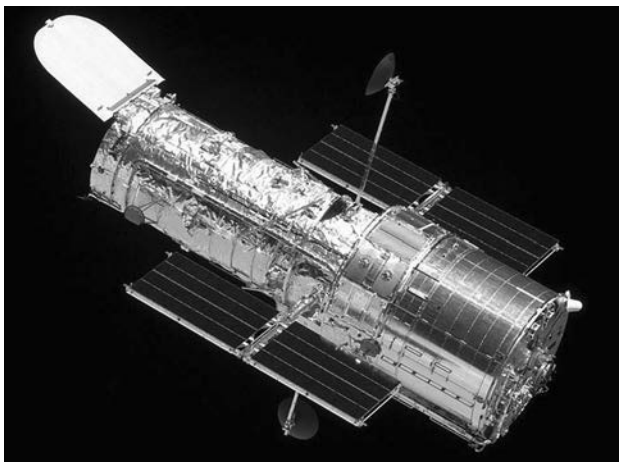
9 The Hubble Space Telescope is in orbit around the Earth.

It detects visible light from distant objects.



(a) Name the force that keeps the telescope in orbit around the Earth.

(1)

.....

(b) The Hubble Space Telescope moves in a circular orbit.

Its distance above the Earth's surface is 560 km.

(i) The radius of the Earth is 6400 km.

Calculate the radius of the orbit of the Hubble Space Telescope.

(1)

Radius = ... km

(ii) The Hubble Space Telescope completes one orbit in 96 minutes.

Calculate its orbital speed in m/s.

(3)

Orbital speed = ... m/s

(c) The Chandra Telescope also orbits the Earth, but does not move in a circular orbit.

Its distance from the Earth and its speed change as it orbits the Earth.

It travels fastest when it is closest to the Earth.

Use ideas about energy to explain why.

(3)

(d) The Chandra Telescope detects X-rays from distant objects.

(i) State the name of the type of wave that includes X-rays and visible light.

(1)

(ii) Describe **two** differences between X-rays and visible light.

(2)

1

2

(Total for Question 9 = 11 marks)