Question 13 (10 marks)

A 200 kg satellite is put into a low Earth orbit at an altitude of 300 km.

300 km

Direction of orbit

Earth
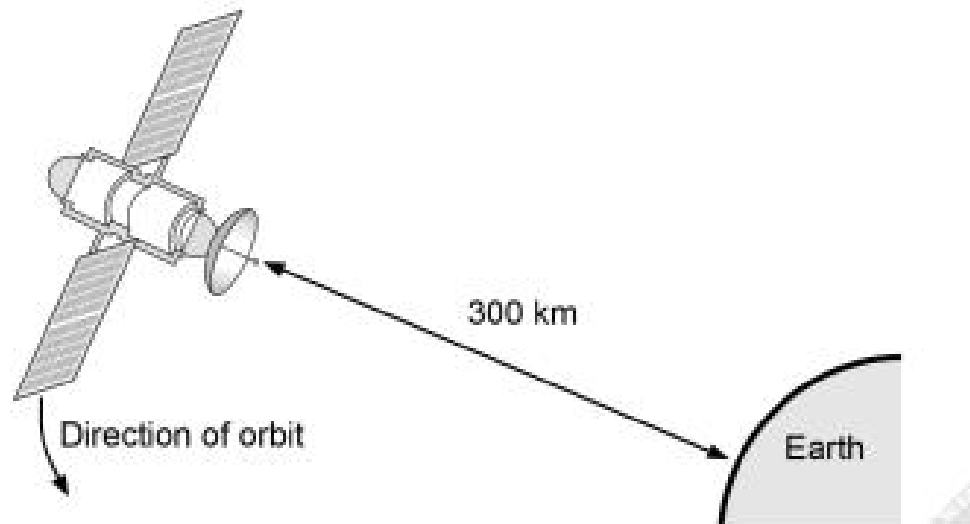
(a) Calculate the orbital speed of the satellite. (3 marks)

Answer _____ m s^{-1}

(b) Calculate the orbital period of the satellite. (2 marks)

(c)   Calculate the gravitational acceleration experienced by the satellite in orbit.   (2 marks)

Answer _____ m s^{-2}

An amateur astronomer on Earth measures the orbital period of the international space station in the night sky at 94.7 minutes.

(d)   Calculate the altitude of the international space station based on an orbital period of 94.7 minutes.   (3 marks)