CSD2301 Practice
17. **Gravitation**

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Practice Question 1

A typical adult human has a mass of about 70 kg. (a) What force does a full moon exert on such a human when it is directly overhead with its center 378,000 km away? (b) Compare this force with the force exerted on the human by the earth.

Practice Question 2

An 8 kg point mass and a 15 kg point mass are held in place 50.0 cm apart. A particle of mass m is released from a point between the two masses 20.0 cm from the 8 kg mass along the line connecting the two fixed masses. Find the magnitude and direction of the acceleration of the particle.

Practice Question 3

Ten days after it was launched toward Mars in December 1998, the Mars Climate Orbiter spacecraft (mass 629 kg) was 2.87×10^6 km from the earth and travelling at 1.20×10^4 km/h relative to the earth. At this time, what were (a) the spacecraft's kinetic energy relative to the earth and (b) the potential energy of the earth-spacecraft system? Mass of earth is 5.97×10^{24} kg

Practice Question 4

The International Space Station makes 15.65 revolutions per day in its orbit around the earth. Assuming a circular orbit, how high is this satellite above the surface of the earth? Mass of earth is 5.97×10^{24} kg and radius of earth is 6380 km.

Practice Question 5

NASA launched the Aura spacecraft to study the earth's climate and atmosphere. This satellite was injected into an orbit 705 km above the earth's surface, and we shall assume a circular orbit. (a) How many hours does it take this satellite to make one orbit? (b) How fast (in km/s) is the Aura spacecraft moving? Mass of earth is 5.97×10^{24} kg and radius of earth is 6380 km.