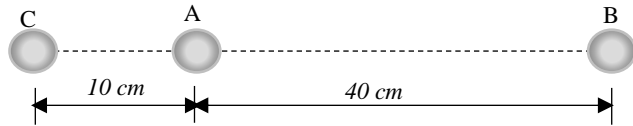


Problem 1)

Find the magnitude and direction of the net gravitational force on mass A due to masses B and C.

Each mass is 20.00 kg.

**Problem 2)**

A particle of mass $3m$ is located 1.00 m from a particle of mass m .

- Where should you put a third mass M so that the net gravitational force on M due to the two masses is exactly zero?
- Is the equilibrium of M at this point stable or unstable
 - for the points along the line connecting m and $3m$, and
 - for points along the line passing through M and perpendicular to the line connecting m and $3m$?

Problem 3)

The largest moon of the planet Uranus, Titania, has $1/8$ the radius of the earth and $1/1700$ the mass of earth.

- What is the acceleration due to gravity at the surface of Titania?
- What is the average density of Titania?

Radius of earth = 6.38×10^6 m and mass of earth = 5.97×10^{24} kg

Problem 4)

Calculate the earth's gravity force on a 75-kg astronaut who is repairing the Hubble Space Telescope 600 km above earth's surface, and then compare this value with his weight at the earth's surface. In view of your result, explain why we say astronaut are weightless when they orbit the earth in satellite such as a space shuttle. Is it because the gravitational pull of

Problem 5)

On July 15, 2004, NASA launched the Aura spacecraft to study earth's climate and atmosphere. This satellite was injected into orbit 705 km above the earth's surface. Assume a circular orbit.

- How many hours does it take this satellite to make one orbit?
- How fast (in km/h) is the Aura spacecraft is moving?