

Mastering Physics Solutions Chapter 12 Gravity

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Chapter 12 Gravity Q.1CQ

It is often said that astronauts in orbit experience weightlessness because they are beyond the pull of Earth's gravity. Is this statement correct? Explain.

Solution:

No The force of Earth's gravity is practically as strong in orbit as it is on the surface of Earth The astronauts experience weightlessness because they are in constant free fall.

Chapter 12 Gravity Q.1P

CE System A has masses m and m separated by a distance r ; system B has masses m and $2m$ separated by a distance $2r$; system C has masses $2m$ and $3m$ separated by a distance $2r$, and system D has masses $4m$ and $5m$ separated by a distance $3r$. Rank these systems in order of increasing gravitational force. Indicate ties where appropriate.

Solution:

The gravitational force between two masses is directly proportional to products of their masses and inversely proportional to square of the distance between them.

$$F = \frac{G(m_1)(m_2)}{r^2}$$

If the masses are greater with less distance then the force of attraction is greater.

System D > System C > System A > System B.

