

Force and motion

1. State Newton's law of gravitation.
2. Define G . Also write its value and SI unit.
3. What is the value of the universal gravitational constant (G)?
4. Write two differences between freefall and weightlessness.
5. Explain the feather and coin experiment.
6. A person can lift a mass of 100 kg on the surface of the earth. What mass can he/she lift on the surface of the moon?
7. In a hydraulic machine, the ratio of the cross-sectional area of the big cylinder to the small cylinder is 30:1. Calculate the load overcome by the big piston when applying the effort of 600N on the small piston.
8. What will be the effect on the acceleration due to the gravity of the earth if it is compressed to the size of the moon?
9. A coin and a feather are dropped in a vacuum. Which one will reach the ground first? Why?
10. What is free fall? What happens to the weight of a body when it is falling freely under the action of gravity?

11. A sphere of mass 40 kg is attracted by another sphere of mass 15 kg with a force of 9.8×10^{-7} N. Find the value of the universal gravitational constant if the centers of spheres are 20 cm apart.
12. Calculate the force of attraction between two bodies with a mass of 100 kg each and they are 1 m apart on the surface of the earth. Will the force of attraction be different if the same bodies are taken on the moon, their separation remaining constant?