Chapter 10 - Gravitation

Short Answer Type Questions

1. What is the source of centripetal force that a planet requires to revolve around the Sun? On what factors does that force depend?
2. On the earth, a stone is thrown from a height in a direction parallel to the earth's surface while another stone is simultaneously dropped from the same height. Which stone would reach the ground first and why?
3. Suppose gravity of earth suddenly becomes zero, then in which direction will the moon begin to move if no other celestial body affects it?
4. Identical packets are dropped from two aeroplanes, one above the equator and the other above the north pole, both at height h. Assuming all conditions are identical, will those packets take same time to reach the surface of earth. Justify your answer.
5. The weight of any person on the moon is about 1/6 times that on the earth. He can lift a mass of 15 kg on the earth. What will be the maximum mass, which can be lifted by the same force applied by the person on the moon?
6. Calculate the average density of the earth in terms of g, G and R.
7. The earth is acted upon by gravitation of Sun, even though it does not fall into the Sun. Why?

Long Answer Type Questions

1. How does the weight of an object vary with respect to mass and radius of the earth. In a hypothetical case, if the diameter of the earth becomes half of its present value and its mass becomes four times of its present value, then how would the weight of any object on the surface of the earth be affected?
2. How does the force of attraction between the two bodies depend upon their masses and distance between them? A student thought that two bricks tied together would fall faster than a single one under the action of gravity. Do you agree with his hypothesis or not? Comment.

3. Two objects of masses m_1 and m_2 having the same size are dropped simultaneously from heights h_1 and h_2 respectively. Find out the ratio of time they would take in reaching the ground. Will this ratio remain the same if
   - (i) one of the objects is hollow and the other one is solid and
   - (ii) both of them are hollow, size remaining the same in each case. Give reason.

4. (a) A cube of side 5 cm is immersed in water and then in saturated salt solution. In which case will it experience a greater buoyant force. If each side of the cube is reduced to 4 cm and then immersed in water, what will be the effect on the buoyant force experienced by the cube as compared to the first case for water. Give reason for each case.
   (b) A ball weighing 4 kg of density 4000 kg m^{-3} is completely immersed in water of density 103 kg m^{-3} Find the force of buoyancy on it. (Given g = 10 m s^{-2}.)