

1. The change in the value of 'g' at a height 'h' above the surface of the earth is the same as at a depth 'd' below the surface of earth. When both 'd' and 'h' are much smaller than the radius of the earth, then which one of the following is correct ?
 (a) $d = 3h / 2$ (b) $d = h / 2$ (c) $d = h$ (d) $d = 2h$
 2. An infinite number of identical point masses each equal to m are placed at points $x = 1, x = 2, x = 4, x = 8, \dots$. The total gravitational potential at point at $x = 0$ is
 (a) $- Gm$ (b) $- 2Gm$ (c) $+ 2Gm$ (d) infinite
 3. A satellite of mass m revolves around the earth of radius R at a height x from its surface. If g is the acceleration due to gravity on the surface of the earth, the orbital speed of the satellite is
 (a) gx (b) $gR / (R - x)$ (c) $gR^2 / (R + x)$ (d) $[gR^2 / (R + x)]^{1/2}$
 4. If the distance between the earth and the sun were half its present value, the number of days in a year would have been
 (a) 64.5 (b) 129 (c) 182.5 (d) 730
 5. The time-period of revolution of planet A around the sun is 8 times that of B. The distance of A from the sun is how many times greater than that of B from the sun?
 (a) 2 (b) 3 (c) 4 (d) 5
1. Determine the force of attraction between a uniform sphere of mass M and a uniform rod of length L and mass m, if the distance of the near end of the rod from the centre of the sphere is r
 2. A man jump 2m high on the earth. Calculate the approximate height he might be able to jump on a planet, where density is $1/4^{\text{th}}$ and radius $1/3^{\text{rd}}$ that of earth
 3. A body travels half the total distance in the last second during free fall. Find its height from the ground and the total time of free fall
 4. A rocket is launched vertically from the surface of earth with an initial velocity u. Find the height up to which the rocket can go from the surface of earth before falling back
 5. Find an expression for the effect of rotation of earth on acceleration due to gravity
 6. Derive an expression for Escape velocity for an object on the surface of earth
 7. Define Kepler's laws of planetary motion. Proof it's second law