

Class XI

Gravitation 1

1. On which fundamental law of physics is Kepler's second law is based? 1
 2. Which is greater the attraction of the earth for 1 kg of aluminum or aluminum or attraction of 1kg of aluminum for the earth? 1
 3. Distance between two bodies is increased to three times its original value. What is the effect on the gravitational force between them? 1
 4. The distance of the planet Jupiter from the sun is 5.2 times that of the earth. Find the period of the Jupiter's revolution around the sun? 2
 5. Show that for a two particle system $\vec{F}_{12} = -\vec{F}_{21}$ 2
 6. State two essential requisites of geostationary satellite? 2
 7. Show that an artificial satellite circling round the earth in an orbit of radius obeys kepler's third law? 2
 8. A 400kg satellite in a circular orbit of radius $2 R_E$ about the earth calculate the kinetic energy, potential energy and total energy of the satellite? $R_E = 6.4 \times 10^6 \text{m}$, $M = 6 \times 10^{24} \text{kg}$ 3
 9. Two uniform solid spheres of radii R and $2R$ are at rest with their surfaces just touching. Find the force of gravitational attraction between them if density of spheres be P ? 2
 10. Find expressions for (1) potential energy (2) kinetic energy (3) total energy for an artificial satellite. 3
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Class XI

Gravitation 2

1. The gravitational force between two blocks is F what would happen if a mass of both the blocks as well as distance between them is doubled? 1
 2. A body is weightless at the centre of earth. Why? 1
 3. Where will a body weigh more at Delhi or at Shimla? Why? 1
 4. Find an expression for the weight of a body at the centre of the earth? 1
 5. Find an expression for gravitational intensity due to earth at a point on its free surface. 2
 6. The earth's mass is 80 times that of moon and their diameters are in the ratio 4:1 respectively. What is the value of g on moon? 2
 7. Determine the value of g at the bottom of an ocean 7km deep Given that radius of earth is 6370 km and $g = 9.8 \text{m/s}^2$. 1
 8. Show that value of g at a height h is same as the value of acceleration due of gravity at a depth $d = 2h$ 2
 9. If T be the period of satellite revolving just above the surface of a planet whose average density is p , show that PT^2 is a universal constant. 2
 10. Define Gravitational potential energy Hence deduces an expression for gravitational potential energy of a body placed at a point sear the surface of earth? 3
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Class XI
Gravitation 3

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| 1. | Why is gravitational potential energy always negative? | 1 |
| 2. | At what height above the surface of the earth value of acceleration due to gravity is reduced to one fourth of its value on the surface of the earth? | 2 |
| 3. | Name two factors which determine whether a planet has atmosphere or not? | 1 |
| 4. | What is Kepler's law of periods? Show it mathematically? | 2 |
| 5. | With two characteristics of gravitational force? | 2 |
| 6. | Assuming earth to be a uniform sphere finds an expression for density of earth in terms of g and G ? | 2 |
| 7. | If radius of earth is 6400km, what will be the weight of 1 quintal body if taken to the height of 1600 km above the sea level? | 2 |
| 8. | A satellite is revolving in a circular path close to a planet of density ρ . find an expression for its period of revolution? | 2 |
| 9. | How far away from the surface of earth does the value of g is reduced to 4% of its value on the surface of the earth Given radius of earth = 6400km | 2 |
| 10. | Obtain an expression showing variation of acceleration due to gravity with height? | 2 |