



Gravitation Numerical

1. Calculate the force of gravitation due to earth on a ball of 1 kg mass lying on the ground
 $G=6.7 \times 10^{-11}$, mass of the earth 6×10^{24} kg, $r= 6.4 \times 10^6$ m
2. Find the value of g on the surface of the earth
3. Calculate the force in between two objects of masses 50 kg and 120 kg respectively kept at a distance of 10m from one another. $G=6.7 \times 10^{-11}$
4. If we double one mass double and make the distance half then what will be the new force?
5. When a ball is thrown vertically upwards, it goes through a distance of 19.6m. Find the initial velocity of the ball and the time taken by it to rise to the highest point. $g=9.8\text{m/s}^2$
6. Find the small g of the moon if the mass is 60kg and weight on the earth is 600 N.
7. If the gravitational force is 20N then find the acceleration of the object if it moves with a force of 20N.
8. If you double two masses then what will be other change is required to keep the same force?
9. Find the height of a bridge over a river from where a stone is dropped and it takes 2 seconds to touch the surface of the water. $g=9.8\text{m/s}^2$
10. One physical quantity measured by beam balance is 20 gm then find its measurement by spring balance.
11. A child drops a coin from the top of a building which is 50 m high. Calculate the velocity of the coin when it falls through 20 m distance. Also calculate the velocity when it touches the ground.
12. A stone is dropped from a building. It takes 4 seconds to reach the ground. Find the height of the building.
13. An object thrown vertically upwards and rise the height of 20m. calculate the velocity with which the object was thrown upwards and the time taken by the object to reach the highest point.
14. What's happened to the force between two objects 1. when the mass of one object is doubled 2. distance between the two objects is doubled 3. mass of the both objects doubled.
15. What is the acceleration of the free fall?
16. A ball is thrown vertically upwards with a velocity of 49 m/s. calculate the maximum height to which it rises and the total time taken to return to the surface of the earth.

17. gravitational force of moon $\frac{1}{6}$ th of the earth. What is the weight in Newtons of a 10 kg object on the moon and the earth?
18. If the mass of an object is 40 kg on the earth, find weight on the earth, on the moon and mass on the moon. 3
19. The mass of an empty bucket of capacity 10 litres is 1 kg. Find its mass when completely filled with a liquid of relative density 0.8. 2
20. Calculate the gravitational force between a 10 kg ball and a 100 kg ball separated by a distance of 10m 3
21. A dining hall has dimension 50m* 15m* 3.5m. Calculate the mass of air in the hall. Density of air 1.30kg/m^3 2
22. Solid weighs 80 gm in air, 64 gm in water. Calculate the relative density of the solid. 2
23. A stone is allowed to fall from the top of the tower 100m high and at the same time another stone is projected upwards from the ground with a velocity of 25 m/s. calculate when and where two stones meet.
24. A ball thrown up vertically returns to the throw after 6 sec. find
 - a) The velocity with which it was thrown up
 - b) The maximum height it reaches
 - c) Its position after 4 seconds
25. Two electrons each of mass 9.1×10^{-31} kg are placed at distance of 10^{-10} m. calculate the gravitational force between them.
26. The gravitational force between two objects is 100N. what would be distance between the objects so that the new force is 50N.
27. The gravitational force between two objects is F. what will be the new force change when the old force is 16N
 - a) Distance is reduced to half?
 - b) The mass of each object is quadruplet
28. A body of mass 1 kg is placed at a distance of 2 m from another body of mass 10 kg. At what distance from the body of 1 kg another body of mass 5kg be placed so that the net force of gravitation acting on the body of mass 1kg is 0?
29. A stone is dropped from the edge of the roof. How long does it take to fall 4.9 m? how fast does it move at the end of that fall?
30. The weight of a man on earth is 588N. Find its mass. $g=9.8\text{m/s}^2$. also find the weight of the man on the moon
31. What is the value and unit of G?
32. A body is dropped from a tower 180m high. How long does it take to reach the ground? What is the velocity when it touches the ground? $g=10\text{m/s}^2$

33. What is the ratio of g of earth and moon?
34. Suppose a planet exists whose mass and radius half of those of earth. Calculate the acceleration due to gravity on the surface of this planet.
35. You are given a sphere of volume 33 cm^3 . If you are asked to select a best suited spring balance to determine its weight, then what should be the range of the spring balance? Density is 7 gm/cm^3 .
36. Calculate the greatest and least pressure exerted by a metal block of size $20 \text{ cm} \times 8 \text{ cm} \times 5 \text{ cm}$. having mass 5 kg .
37. A car of mass 1200 kg . this weight is evenly distributed on 4 wheels. If the pressure in each tyre is 15 Pascal what is the area of a single tyre?
38. A body of 50 cm^3 is completely immersed in water. find the buoyant force on it.
39. A solid of density 5000 kg/m^3 weighs 5 N in air. It is completely immersed in water.
- Calculate the apparent weight of the solid in water
 - What will be its apparent weight if water is replaced by a liquid of density 8000 kg/m^3
40. A bottle weighs 30 gm when empty, 53.4 when filled with a liquid and 48 gm when filled with water. Calculate the density of the liquid
41. The mass of an empty 40 litre petrol tank of a vehicle is 8 kg . what will be its mass when filled completely with a fuel of density 700 kg/m^3 . $1 \text{ m}^3 = 1000 \text{ litre}$
42. The volume of a solid of mass 500 kg is 350 cm^3
- What is the density of this solid?
 - What will be the mass of water displaced by this solid?
 - What will be the relative density of the solid?
 - Will it float or sink?
43. A force of 20 N acts upon a body whose weight is 9.8 N . what is the mass of the body and how much is it accelerated?
44. An object has mass of 20 kg on earth. What will be it's a) mass b) weight on the moon?
45. A stone is dropped from a top of a tower of height 19.6 m . calculate its final velocity before touching the ground.