

WORKSHEET 3
Subject: Physics
GRAVITATION
Class: IX

1. Define : gravitation, gravity and gravitational force.
2. State the universal law of gravitation and its mathematical form.
3. In what source is 'G' universal?
4. What happens to the force of attraction between two objects when
 - (i) Their mass are halved?
 - (ii) Distance between them is increased to 4 times its previous value.
 - (iii) Distance between them as well as each of the mass is increase to 4 times.
5. If the distance between two bodies is increased 4 times by what factor should the mass of the bodies be altered so that the gravitational force between them remains the same?
6. What is the force between two spheres weighing 20 kg each and placed 50 cm apart?
7. A sphere of mass 40 kg is attracted by another sphere of mass 15 kg when their centres are 0.2m apart with force of 9.8×10^{-7} N. Calculate value of 'G'.
8. Find the distance between two stones each of mass 2 kg so that the gravitational force between them is 1N.
9. Gravitational force between two objects on earth is 2N. What will be the gravitational force between these two objects on the surface of the earth?
10. Why don't we see objects in the universe colliding or moving towards each other due to gravitational force?
11. Why do all objects fall towards the earth?
12. Give a few examples / applications of the universal law of gravitation.
13. On what factor [s] does the gravity of a planet depend?
14. Define 'G' and give its value.
15. Differentiate between 'g' and 'G'.
16. Define 'g' and give its value on the surface of the earth.
17. Name the factors on which 'g' depends.
18. Calculate the gravitational force between a body of mass 100 kg and the earth. Also calculate the acceleration produced in the body and that in earth.
19. A body weighs 1 kg on the surface of the moon. If mass of the moon is 7.4×10^{22} kg and radius of moon is 1740 km. Calculate:
 - a. The force acting between the body & the moon.
 - b. Acceleration produced in the body
 - c. Acceleration produced in moon.
20. A planet has mass and radius 1/3 of those of earth. Calculate the acceleration due to gravity of the planet and compare it with acceleration due to gravity on earth. If an object has 5 kg mass on earth. Calculate its weight on the planet.
21. Differentiate between mass & weight of a body.
22. A ball is thrown vertically upwards with a velocity of 49 m/s. Calculate:
 - i. the max height to which it rises.
 - (ii) total time it takes to return to surface of the earth.
23. A stone is released from the top of a tower of height 19.6 m. Calculate the final velocity of a body just before touching the ground.
24. A stone is thrown vertically upwards with an initial velocity of 40m/s. Find the max height reached by the stone. What is the net displacement and the total distance covered by the stone? [$g = 10\text{m/s}^2$]
25. The object dropped from a height (h) with initial velocity zero strikes the ground with a velocity of 30m/s. How long does it take to reach the ground. Also find h [$g = 10\text{m/s}^2$]
26. The mass of a man is 75 kg. What will be his weight on surface of earth? What will be his weight on surface of moon?
27. A ball is projected vertically upwards with a certain velocity. What is its acceleration?