

Physics Worksheet Class IX  
Gravitation

1. State the universal law of gravitation. Why  $G$  is called the Universal gravitation constant?
2. a) What happens to the force of gravitation between two objects if the masses of both objects are doubled? How does the force of gravitation change when the distance between two objects is reduced (i) half (ii) tripled?  
b) What is the value of  $G$  on Jupiter?
3. The earth attracts an apple. Does the apple also attract the earth? If it does, why does the earth not move towards the apple?
4. State two factors on which the gravitation force between two objects depends.
5. a) The universal law of gravitation successfully explained several phenomena. Mention any three.  
b) Write the SI unit of  $G$ .
6. a) What is meant by free fall?  
b) Is there any change in velocity of a freely falling body? Discuss.
7. Two bodies, one of mass  $1\text{g}$  and other of mass  $1\text{Kg}$  are dropped from the same height in the vacuum. Compare the two time intervals in which the two bodies will hit the ground.
8. What is meant by acceleration due to gravity?
9. A stone is released from the top of a tower of height  $19.6\text{ m}$ . Calculate its final velocity just before touching the ground. (Take  $g = 9.8\text{ m/s}^2$ )
10. List in tabular form any three differences between ' $g$ ' and ' $G$ '.
11. Explain why the value of ' $g$ ' changes from poles to equator on the surface of the earth.
12. What is meant by weight of an object? Mass of an object is  $10\text{kg}$ . What is its weight on the earth?
13. You buy a bag of sugar of weight  $W$  at a place on the equator. You take this to Antarctica. Would its weight be the same there? If not, will it increase or decrease?
14. Derive an expression for acceleration due to gravity on a planet of mass  $M$  and radius  $R$ .
15. Distinguish between mass and weight of an object.
16. What will be the acceleration of a body of mass  $5\text{ kg}$  if a force of  $200\text{ N}$  is applied on it?
17. A ball thrown up vertically returns to the thrower after  $4\text{s}$ . Find
  - (a) The velocity with which it was thrown up.
  - (b) The maximum height it reaches and
  - (c) Its positions after  $3\text{s}$
18. What is the mass of an object whose weight is  $196\text{ N}$ ?
19. How is pressure related to the thrust exerted on a surface?
20. State and define SI unit of pressure.
21. State Archimedes principle. Name the devices based on Archimedes principle.

22. Which will exert more pressure- 100 Kg mass on 10 m or 50 Kg mass on 4m? Give reason.
23. What is meant by buoyancy?
24. What happens when:
- (a) Buoyant force exerted by the fluid is greater than the weight of the body?
  - (b) Buoyant force exerted by the fluid is equal to the weight of the body?
25. Why are railway tracks laid on large sized concrete sleepers? Explain.
26. (a) Explain why a truck or a motor bus has much wider tyres?  
(b) Why do we feel lighter when we swim?
27. Why does a nail sink in water but a piece of cork floats on it?
28. The volume of bag of mass 1250 g is  $150 \text{ cm}^3$ . If this bag is put on water, will it float or sink? Justify your answer. Also, find the volume of water displaced by the bag.
29. (a) State two factors on which the magnitude of buoyant force acting on a body immersed in a fluid depends.  
(b) Will buoyant force exerted by a liquid increase if its volume is increased?
30. Differentiate between density and relative density.