

10. Gravitation

- Q 1 Name the force due to which a body performs circular motion.
Mark (1)
- Q 2 What is the nature of gravitational force?
Mark (1)
- Q 3 What is the numerical value of gravitational constant?
Mark (1)
- Q 4 Define thrust.
Mark (1)
- Q 5 Name the force experienced by the body when it is immersed in a liquid.
Mark (1)
- Q 6 What do you mean by the weight of the body?
Mark (1)
- Q 7 What is the acceleration of free fall?
Mark (1)
- Q 8 What is the weight of an object on moon?
Mark (1)
- Q 9 Why the cutting edge of a knife should be as sharp as possible?
Mark (1)
- Q 10 Iron nails sinks in water. Why?
Mark (1)
- Q 11 Explain, why the value of 'g' is greater at poles than at equator.
Mark (1)
- Q 12 Why does a truck or motor-bus has much wider tyres?
Mark (1)
- Q 13 What do you mean by force of buoyancy?
Mark (1)
- Q 14 State Archimedes' principle.
Mark (1)
- Q 15 The density of gold is $19.3 \times 10^3 \text{ kg/m}^3$. Find its relative density.
Mark (1)

Q 16 Give any two applications of Archimedes principle.

Mark (1)

Q 17 What is a hydrometer? What is the principle of hydrometer?

Mark (1)

Q 18 Explain why moon moves around earth.

Marks (2)

Q 19 A stone is dropped from the top of a building of height 45 m. Calculate its velocity , when it strikes the ground.(Take $g=10 \text{ m/s}^2$)

Marks (2)

Q 20 A body is thrown up with a velocity of 29.4m/sec.Find the time taken by the body to reach its highest point? After how much time the body will come back on the ground?

Marks (2)

Q 21 If the earth attracts an apple, why does not an apple attracts the earth ?

Marks (2)

Q 22 A sheet of paper fall slower than the one that is crumpled into ball. Why?

Marks (2)

Q 23 The mass of Seema is 45kg. What will be her weight on the surface of the earth? What will be her weight on the surface of the moon?

Marks (2)

Q 24 Why fluid exert pressure ?How is the pressure transmitted in a fluid?

Marks (2)

Q 25 State the importance of the universal law of gravitation.

Marks (2)

Q 26 State Newton's Law of Gravitation. Why Newton's Law of Gravitation is known as Universal Law of Gravitation?

Marks (2)

Q 27 What are two main factors on which the buoyant force depends?

Marks (2)

Q 28 Why does an iron nail sink in water but a wooden cork float on water?

Marks (2)

Q 29 An object of volume V is immersed in a liquid of density ρ . Calculate the magnitude of buoyant force acting on the object due to liquid.

Marks (2)

Q 30 What is buoyant force? Write any two applications of Archimedes principle.

Marks (2)

Q 31 A student immerses a block into different liquids. Is the buoyant force acting on the block same for all the liquids?

Marks (2)

Q 32 A plastic ball is released under water. It comes to the surface of the water and doesn't sink in it. Explain the reason.

Marks (2)

Q 33 Define pressure. A force of 200 N is applied on an object of area 10 m^2 . Find the pressure exerted on the body.

Marks (2)

Q 34 Why are the straps of school bags made wider?

Marks (2)

Q 35 What are the factors that affect buoyant force exerted by a liquid on a solid when it is immersed in the liquid?

Marks (2)

Q 36 In what direction does the buoyant force on an object due to a liquid act? What is the relation of buoyant force with the density of a fluid?

Marks (2)

Q 37 Does Archimedes principle hold true for a satellite moving in a circular orbit? Explain.

Marks (2)

Q 38 Mohan threw a pointed dart (arrow) at the dartboard. It stuck to the board, but when he threw a blunt dart, it fell down after hitting the board. Why?

Marks (2)

Q 39 An object is immersed in different liquids. Is same buoyant force acts on an object due to all liquids?

Marks (2)

Q 40 A ball is thrown vertically upwards with a velocity of 49 m/s. Calculate

(a) The maximum height to which it reaches

(b) The total time it takes to return to the surface of the earth

Marks (3)

Q 41 What is the force of gravitation between the earth and the sun, given that the mass of the earth = $6 \times 10^{24} \text{ kg}$ and of the sun = $2 \times 10^{30} \text{ kg}$? The average distance between them is $1.5 \times 10^{11} \text{ m}$.

Marks (3)

Q 42 Two objects of masses m_1 and m_2 exert a force F on each other when they are separated by a distance, r . What happens when

(i) Mass m_1 is doubled,

(ii) The distance between them is halved?

Marks (3)

Q 43 Explain why iron nail sinks in water, but a ship made up of iron floats?

Marks (3)

Q 44 Distinguish between g and G.

Marks (3)

Q 45 A body of weight 600 N rests on the floor of a lift. If the lift begins to fall freely under the gravity, what is the force with which the body presses on the floor?

Marks (3)

Q 46 How can you calculate the value of acceleration due to gravity?

Marks (3)

Q 47 How one can calculate the value of acceleration due to gravity on the surface of the moon?

Given : $G = 6.7 \times 10^{-11} \text{ Nm}^2 / \text{kg}^2$, Mass of moon = $7.4 \times 10^{22} \text{ kg}$,
Radius of moon = 1740 km

Marks (3)

Q 48 If the planet existed whose mass and radius both were half those of the earth, then what will be the acceleration due to gravity at its surface?

Marks (3)

Q 49 To estimate the height of a bridge over a river, a stone is dropped freely in the river from the bridge. The stone takes 2 seconds to touch the water surface in the river. Calculate the height of the bridge from the water level. ($g = 9.8 \text{ m/s}^2$).

Marks (3)

Q 50 How much would a 70 kg man weigh on the moon? What would be his mass on the earth and on the moon? (Acceleration due to gravity on the moon = 1.63 m/s^2)

Marks (3)

Q 51 When a spherical ball is suspended with an iron string, the length of the string increases. However, the length of the string decreases when the ball is completely immersed in water. Why? Explain.

Marks (3)

Q 52 How do a submarine sink and float on water?

Marks (3)

Q 53 Calculate the density of iron if an iron cylinder of radius 14mm and length 80mm weighs 369.6g.

Marks (3)

Q 54 In which case is the depression in the cushion more – when a person stands on it or when he lies down on it? Explain.

Marks (3)

Q 55 Give reasons for the following.

1. A plastic block released under water never stays under water but comes to the surface of the water.
2. Sleepers are laid below the rails.

Marks (3)

Q 56 State and explain the Universal law of Gravitation.

Marks (5)

Q 57 A ball is dropped from the top of a tower 100m high and at the same time another ball is projected vertically upwards from the ground with a velocity of 25m/sec. Calculate where and when the two stones will meet. Take $g=10\text{m/s}^2$.

Marks (5)

Q 58 How will you calculate relative density of a cork using Archimedes's Principle?

Marks (5)

Q 59 (i) How do fishes float in water?

(ii) Write the conditions that takes place when a solid is immersed in a fluid.

Marks (5)

Q 60 The force on a phonogram needle of cross-section of radius of 0.01cm, is 1.5N. Find the pressure it exerts on the record in

(i) Pa

(ii) atm

Marks (5)

Q 61 What do you understand by relative density? What is the unit of relative density?

Manoj have a metal block of dimension 25cm x 10cm x 5cm. Now, if the mass of the block is 5kg, then calculate the greatest and least pressure exerted by the block?

Marks (5)

Q 62 A piece of iron is totally immersed in water. If its density is $7.8 \times 10^3 \text{ kg/m}^3$ and volume is 10^{-4} m^3 then calculate

(i) The upthrust

(ii) Apparent weight of iron piece in water

Marks (5)

Most Important Questions

Q 1 An object dropped from a height always fall towards earth. Why?

Q 2 Weight of an object on earth and moon is different. Why?

Q 3 In your daily life you experience force of gravitation. Give some examples,

Q 4 What is gravitation?

Q 5 State Newton's law of motion.

Q 6 What do you understand by centripetal force?

Q 7 What do you understand by gravitational force?

Q 8 What do you understand by free fall of an object?

Q 9 How does the force of gravitation between two objects change on reducing the distance to half?

Q 10 If we neglect the friction of air then all the objects fall with the same speed. Why does a heavy object do not fall faster?

Q 11 If the earth attracts moon, why doesn't it move towards earth?

Q 12 Every thing exert force on the other. It means that we also exert force on each other. Is this true? If yes, then why we does not feel this force?

Q 13 When my servant bring water in a pitcher, she place a thick piece of cloth on her head before placing pitcher. Why?

Q 14 Moon exert gravitational force on earth. Give one example.

Q 15 State universal law of gravitation.

Q 16 Find the gravitational force acting between earth and an object of 2 kg.

Q 17 What do you mean by free fall?

Q 18 Mass of an object is 20kg. What is its weight of

(i) Earth.

(ii) Moon.

Q 19 What do you understand by thrust?

Q 20 What do you understand by pressure?

Q 21 What is the acceleration for free fall?

Q 22 Acceleration due to gravity is same for all objects. But a book falls faster than a paper. Why?

Q 23 Ball thrown up vertically reaches to maximum height in 6 s. Find

(a) The velocity with which it was thrown up.

(b) The maximum height it reaches.

(c) Its position after 4 s.

Q 24 Rahul took a plastic ball. He pushed it deep in a tank full of water. As soon as he released the ball, the ball comes on the surface of water. Why?

Q 25 Tyres of truck are wider than that of a car. Why?

Q 26 I have a book having dimensions $40\text{cm} \times 30\text{cm} \times 4\text{cm}$ and mass 500g . Find the pressure exerted by it on the table.

(i) When book lies down on the table.

(ii) When book is kept on the table such that it covers $30\text{cm} \times 4\text{cm}$ area of the table.

Q 27 State equations of motion for free fall.

Q 28 A stone is released from the top of a building of height 19 m . Calculate its final velocity.

Q 29 Every thing exert force on the other. It means that we also exert force on each other. Is this true? If yes, then why we does not feel this force?

Q 30 When my servant brings water in a pitcher, she place a thick piece of cloth on her head before placing pitcher. Why?

Q 31 What happens to the force between two objects, if

(i) Mass of one object is tripled?

(ii) Distance between the objects is doubled?

(iii) Masses of both objects are doubled?

Q 32 What do you understand by buoyant force?

Q 33 Give two examples of buoyancy.

Q 34 Give the conditions for an object to float or sink.

Q 35 The volume of a substance of 50 g , is 20 cm^3 . The density of water is 1 g-cm^{-3} . Will the substance float or sink? What will be the weight of water displaced by the substance?

Q 36 State Archimedes' principle.

Q 37 Write some applications of Archimedes' principle.

Q 38 What is relative density?

Q 39 Why we measure the relative density of a substance?

Q 40 Relative density of silver is 11 and the density of water is 103 Kg-m^{-3} . What is the density of silver in S.I. Units?

Q 41 How will you detect that the milk is pure or impure?

Q 42 How will you conclude that a particular sample of water is pure?

Q 43 How does a submarine sinks and float?

Q 44 Show that, if the weight of fluid displaced by the object is more than its weight then it will sink in the fluid.

Q 45 An iron piece weighs 600 g in air and 400 g in water. Find volume of the solid.

Q 46 How an air balloon rises up?