PHYSICS

BOOKS - S CHAND PHYSICS (HINGLISH)

GRAVITATION

Solved Examples

1. Calculate the force of gravitation due to earth on a ball of 1 kg mass lying on the ground.(Mass of earth $= 6 \times 10^{24} kg$ Radius of earth $= 6.4 \times 10^{3}$km and $G = 6.7 \times 10^{-11} N \frac{m^2}{K} g^2$

A. $4.9N$

B. $9.8N$

C. $19.2N$

D. None of the above

Answer: B

Watch Video Solution

2. The mass of Earth is 6×10^{24} kg and that of moon is 7.4×10^{22} kg. if the distance between the earth and the moon is 3.84×10^{5} km, calculate the force exerted by earth on the moon. Given $G = 6.7 \times 10^{11} Nm^2 / kg^2$.

Watch Video Solution

3. Calculate the value of acceleration due to gravity on moon. Given mass of moon $= 7.4 \times 10^{22}$ kg, radius of moon $= 1740$ km.

Watch Video Solution

4. The earth's gravitational force causes an acceleration of $5m/s^2$ in 1 kg mass somewhere in space. How much will the acceleration of a 3 kg mass be at the same place?

Watch Video Solution

5. To estimate the height of a bridge over a river, a stone is dropped freely on the river from the bridge. The stone takes 2 s to touch the water surface in the river. Calculate the height of the bridge from the water level. Take $g = 9.8m/s^2$

Watch Video Solution

6. When a ball is thrown vertically upwards it goes through a distance of 19.6 m. Find the initial velocity of the ball and the time taken by it to rise to the high point (Acceleration due to gravity $g = 9.8\frac{m}{s^2}$)

Watch Video Solution

7. A cricket ball is dropped from a height of 20 meters.

(a) Calculate the speed of the ball when it hits the ground.

(b) Calculate the time it takes to fall though this height $(g = 10m/s^2)$

Watch Video Solution

8. A ball is thrown up with a speed of 15 m/s . How high wiil it go before it begins to fall ? $(g = 9.8m/s^2$

A. 11.4 m

B. 15 m

C. 4 m

D. None

Answer: A

Watch Video Solution

9. Mass of a body is 5 kg .What is its weight ?

Watch Video Solution

10. What is the mass of an object whose weight is 49 newtons?

A. 5 kg

B. 6 kg

C. 7 kg

D. 8 kg

Answer: A

Watch Video Solution

11. A man weigh 600 N on the earth. What is its mass? Take $g = 10m/s^2$. If he were taken on moon, his weight would be 100 N. What is his mass on moon? What is acceleration due to gravity on moon?

Watch Video Solution

12. How much would a 70 kg man weigh on moon ?what will be his mass on earth and moon ? Given g on moon $= 1.7m/s^2$.

Watch Video Solution

13. a force of 100 N is applied on an object of area $2m^2$. Calculate the pressure

Watch Video Solution

14. A woman is wearing sharp heeled shoes or pencil heeled shoes (called stilettos). If the mass of this woman is 50 kg and the area of one heel is $1cm^2$, Calculate the pressure exerted on the ground when the woman stands on just one heel.$\left(g = 10m/s^2\right)$

A. $5.0 \times 10^6 N/m^2$

B. $5.0 \times 10^3 N/m^2$

C. $5.0 \times 10^{-2} N/m^2$

D. None of the above

Answer: A

Watch Video Solution

15. When an aluminium object is immersed in water it displaces 5 kg of water .How much is the buoyant force acting on the aluminium

object in newtons ? $\left(g = 10m/s^2\right)$

Watch Video Solution

16. The mass of $2m^3$ of steel is 15600 kg. Calculate the density of steel in SI units .

A. $31200Kg/m^3$

B. $780Kg/m^3$

C. $7800Kg/m^3$

D. None of the above

Answer: C

Watch Video Solution

17. An object of mass 50 g has a volume of $20cm^3$

Calculate the density of the object. If the density of water $1/gcm^2$, state whether the object will float or sink in water.

Watch Video Solution

18. The relative density of silver is 10.8 If the density of water be $1.0 \times 10^3 kgm^{-3}$ calculate the density of silver is SI units.

Watch Video Solution

Sample Problem

1. A rectangular wooden block has mass of 4 kg .The length ,breadth and height of this wooden block are 50 cm,25 cm and 10 cm ,respectively .Find the pressure on the table top:

(a) When the wooden bock is kept with its surface measuring $50cm \times 25cm$ on the table .

(b) When the wooden block is kept with its sufarce measring $25cm \times 10cm$ on the table . (Assume : Acceleration due to gravity , $\left(g = 10\frac{m}{s^2}\right)$

Watch Video Solution

2. The volume of a solid of mass 500 g is $350cm^3$. What will be the density of this solid ?

Watch Video Solution

Exercise

1. What is the value of gravitational constant G (i) on the earth, and (i) on the moon?

Watch Video Solution

2. Which force is responsible for the moon revolving around the earth ?

A. gravitational force

B. centripetal force

C. both

D. moon revolves around earth without any force

Answer: A

Watch Video Solution

3. Does the acceleration produced in a freely falling body depend on the mass of the body ?

Watch Video Solution

Watch Video Solution

4. Who gave three laws of planetary motion ?

Watch Video Solution

5. State the Kepler's law which is represented by the relation $r^3 \propto T^2$

Watch Video Solution

6. Name the property of earth which is responsible for extremely small acceleration being produced in it as a result of attraction by other small objects.

Watch Video Solution

7. What is the acceleration produced in a freely falling body of mass 10 kg ? (Neglect air resistance)

Watch Video Solution

8. When an object is dropped from a height, it accelerates and falls down. Name the force which accelerates the object.

Watch Video Solution

9. Give the formula for the gravitational force F between two bodies of masses M and m kept at a distance d from each other.

Watch Video Solution

10. What force is responsible for the carth revolving round the sun?

Watch Video Solution

11. What name has been given to the force with which two objects lying apart attract each other?

Watch Video Solution

12. Which force is responsible for holding the solar system together ?

Watch Video Solution

13. What is the weight of a 1 kilogram mass on the earth? `(g = 9 .8 m//s^2).

Watch Video Solution

14. On what factors does the weight of a body depend ?

Watch Video Solution

15. As the altitude of a body increases, do the weight and mass both vary ?

Watch Video Solution

16. If the same body is taken to places having different gravitational field strength, then what will vary: its weight or mass?

Watch Video Solution

17. Mass of an object is 10 kg. what is its weight on earth ?

Watch Video Solution

18. The weight of a body is 50 N. What is its mass? $(g = 9.8m/s^2)$

Watch Video Solution

19. A body weighs 10 kg on the surface of earth. What would be its mass and weight at the centre of earth ?

Watch Video Solution

20. Write down the weight of a 50 kg mass on the earth. $(g = 9.8m/s^2)$

Watch Video Solution

21. If the weight of a body on the earth is 6 N, what will it be on the moon?

Watch Video Solution

22. Explain what is meant by the equation $g = G \times \frac{M}{R^2}$

Where the symbols have their usual meanings.

Watch Video Solution

23. (a) What do you mean by the term free fall ?

(b) During a free fall, will heavier objects accelerate more than lighter ones?

Watch Video Solution

24. Does Newton's third law of motion apply to gravitational force?

Watch Video Solution

25. Give reason for the following:

The force of gravitation between two cricket balls is extremely small but that between a cricket ball and the earth is extremely large.

Watch Video Solution

26. Describe how the gravitational force between two objects depends on the distance between them.

Watch Video Solution

27. What happens to the gravitational force between two objects when the distance between them is:

(i) doubled?

(ii) halved?

Watch Video Solution

28. Explain why, if a stone held in our hand is released, it falls towards the earth.

Watch Video Solution

29. Calculate the force of gravitation between two objects of masses 50 kg and 120 kg respectively kept at a distance of 10 m from one another.(Gravitational constant $G = 6.7 \times 10^{-11} Nm^2 / kg^2$)

Watch Video Solution

30. What is the force of gravity on a body of mass 150 kg lying on earth (Mass of earth $= 6 \times 10^{24} kg$ Radius of earth $= 6.4 \times 10^{6} mG = 6.7 \times 10 - 11 Nm^{2} / kg^{2}$)

Watch Video Solution

31. The mass of sun is 2×10^{30} kg and mass of earth is 6×10^{24} kg. If the distance between the centres of sun and earth is 1.5×10^{8} km, calculate the force of gravitation between them.

Watch Video Solution

32. A piece of stone is thrown vertically upwards. It reaches the maximum height in 3 seconds. If the acceleration of the stone be $9.8 m / s^{2}$ directed towards the ground, calculate the initial velocity of the stone with which it apply Newton's third law to the

gravitational force? explain your answer. on the distance between them. on the surface of the earth? is thrown upwards.

Watch Video Solution

33. A stone falls from a building and reaches the ground 2.5 seconds later. How high is the building? $\left(= 9.8m / s^2 \right)$

Watch Video Solution

34. A stone is dropped from a height of 20 m .

(i) How long will it take to reach the ground?

(ii) What will be its speed when it hits the ground? $\left(g = 10m / s^2 \right)$

Watch Video Solution

35. A stone is thrown vertically upwards with a speed of 20 m/s. How high will it go before it begins to fall? $\left(g = 9.8m/s^2\right)$

Watch Video Solution

36. When a cricket ball is thrown vertically upwards, it reaches a maximum height of 5 metres.

(a) What was the initial speed of the ball ?

(b) How much time is taken by the ball to reach the highest point ?

$\left(g = 10ms^{-2}\right)$

Watch Video Solution

37. Write the differences between mass and weight of an object.

Watch Video Solution

38. Can a body have mass but no weight ?

Watch Video Solution

39. 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 its acceleration ?

Watch Video Solution

40. A stone resting on the groud has a gravitional force of 20 N acting on it .What is the weight of the stone? What is its mass ? $\left(g = 10m/s^2\right)$.

Watch Video Solution

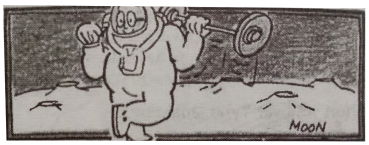
41. An oject has mass of 20 kg on earth .What will be its (i) mass and (ii) weight on the moon ? $\left(\text{g on moon} = 1.6m/s^2\right)$.

Watch Video Solution

42. Which is more fundamental the mass of a body or its weight ? Why ?

Watch Video Solution

43. How much is the weight of an object on the moon as compard to its weight on the earth ? Gives reason for your answer .



Watch Video Solution

44. Define universal gravitational constant. Give its value with SI units.

Watch Video Solution

45. What do you undersatand by the term accelation due to gravity of earth ?

(c) State the SI unit of acceleration due to gravity .

Watch Video Solution

46. State and explain briefly Keplars laws of planetary motion.

Watch Video Solution

47. The mass of a planet is 6×10^{24} kg and its diameters is 12.8×10^{3} km. If the value of gravitational constant be $6.7 \times 10^{-11} NM^2 / Kg^2$,Calculate the value of acceleration due to gravity on the surface of the planet.What planet could this be ?

Watch Video Solution

48. A body is thrown vertically upward with velocity u, the greatest height h to which it will rise is,

A. $\frac{u}{g}$

B. $u^2 / 2g$

C. u^2 / g

D. $u / 2g$

Answer: B

Watch Video Solution

49. The mass of moon is about 0.012 times that of earth and its diameter is about 0.25 times that of earth .The value of G on the moon will be

A. Less than that of earth

B. More than that on the earth

C. Same as that on the earth

D. About one sixth of that on the earth

Answer: C

Watch Video Solution

50. The value of g on the surface of the moon

A. Is the same as on the earth

B. Is less than that on the earth

C. Is more than that on the earth

D. Keep changing day by day

Answer: B

Watch Video Solution

51. The atmosphere is held to the earth by

A. Winds

B. Clouds

C. Earths magnetic field

D. Gravity

Answer: D

Watch Video Solution

52. The force of attraction between two unit point masses separated by a unit distance is called

A. Gravitational potential

B. Acceleration due to gravity

C. Gravitational field strength

D. Universal gravitational constant

Answer: D

Watch Video Solution

53. The weight of an object at the center of the earth of radius R is

A. Zero

B. R times the weight at the surface of the earth

C. Infinite

D. $1/R^2$ times the weight at the surface of the earth

Answer: A

Watch Video Solution

54. Two object of different masses falling freely near the surface of moon would

A. have same velocities at any instant

B. have different accelerations

C. experience forces forces of same magnitude

D. undergo a change in their inertia

Answer: A

Watch Video Solution

55. Law of gravitation gives the gravitational force between

A. the earth and a point the earth only

B. depends on the redius of sun only

C. depends on both mass and radiius of earth

D. depends neither on mass nor on redius of earht

Answer: d

Watch Video Solution

56. Two particles are placed at some distance. If the mass of each of the two particles is doubled, keeping the distance between them unchanged, the value of gravitational force between them will be

A. 1/4 times

B. 1/2 times

C. 4 times

D. 2 times

Answer: c

Watch Video Solution

57. In the relation $F = GMm/d^2$, the quantity G

A. depends on the value of g at the place of observation

B. is used only when the earth is one of the two masses

C. is the greatest on the surface of the earth

D. is universal constant of nature

Answer: D

Watch Video Solution

58. The gravitational force of attraction between two objects is x. Keeping the masses of the objects unchanged, if the distance between the objects is halved, then the magnitude of gravitational force between them will become:

A. x/4

B. x/2

C. 2x

D. 4x

Answer: D

Watch Video Solution

59. According to one of the Kepler's laws of planetary motion:

A. $r^2 \propto T^3$

B. $r \propto T^2$

C. $r^3 \propto T^2$

D. $r^3 \propto \frac{1}{T^2}$

Answer: C

Watch Video Solution

60. If the distance between two masses is increased by a factor of 5, by what factor would the mass of one of them have to be altered to maintain the same gravitational force? Would this be an increase or decrease in the mass?

Watch Video Solution

61. Universal law of gravitation states that every object exerts a gravitational force of attraction on every other object. If this is true, why don't we notice such forces? Why don't the two objects in a room move towards each other due to this force?

Watch Video Solution

62. Suppose a planet exists whose mass and radius both, are half those of earth. Calculate the acceleration due to gravity on the

surface of this planet.

A. $9.8m/s^2$

B. $19.6m/s^2$

C. $4.9m/s^2$

D. $39.2m/s^2$

Answer: B

Watch Video Solution

63. Name the quantity whose one of the units is pascal (Pa)

Watch Video Solution

64. State whether the following statements are true or false:

(a) The buoyant force depends on the nature of object immersed in

liquid act ?

Archimedes' principle can also be applied to gases.

Watch Video Solution

65. In which direction does the buoyant force on an object due to a liquid act ?

Watch Video Solution

66. What is the other name of buoyant force

Watch Video Solution

67. Name the force which makes heavy objects appear light when immersed in a liquid.

Watch Video Solution

68. What is upthrust ?

Watch Video Solution

69. What name is given to trust per unit area ?

Watch Video Solution

70. What is meant by the term buoyancy ?

Watch Video Solution

71. Why does ice oat in water ?

Watch Video Solution

72. What force acting on an area of $0.5m^2$ will produce a pressure of 500 Pa ?

Watch Video Solution

73. An object of weight 200 N is floating in a liquid. What is the magnitude of buoyant force acting on it ?

Watch Video Solution

74. Name the scientist who gave the magnitude of buoyant force acting on a solid object immersed in a liquid.

Watch Video Solution

75. The density of gold is $19g/cm^2$. Find the volume of 95 g of gold.

Watch Video Solution

76. What is the mass of $5m^3$ of cement of density $3000kg/m^3$?

Watch Video Solution

77. Wjhat is the density of a substance of mass 100 g and volume $10cm^3$

Watch Video Solution

78. The density of a body is $800kg/m^3$.Will it sink of float when dipped in a bucket of water ? (Density of water $= 1000kg/m^3$)

Watch Video Solution

79. (a) what is the difference between the density and relative density of a substance ?

(b) If the relative density of a substance is 7.1 what will be its density in SI units ?

Watch Video Solution

80. Define thrust .What is its units ?

Watch Video Solution

81. Why do we feel light on our feet when standing in a swimming pool with water up to our armptis ?

Watch Video Solution

82. Explain why,big boulders can be moved easily by flood ?

Watch Video Solution

83. An iron nail sinks in water but it floats in mercury. Why ?

Watch Video Solution

84. Expain why, a piece of glass sinks in water but it floats in mercury.

Watch Video Solution

85. Steel sinks in water but a steel boat floats .why ?

Watch Video Solution

86. Explain why, school bags are provided with wide straps to carry them.

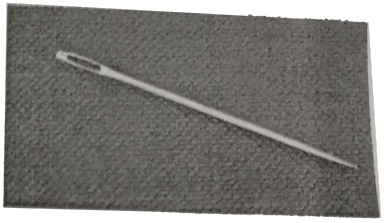
Watch Video Solution

87. Why does a sharp knife cut object more effectively than a blunt knife ?

Watch Video Solution

88. Explain why a wide steel belt is provided over the wheels of an army tank.

A wide steel belt is provided over the wheels



The tip of a sewing needle is sharp

Watch Video Solution

89. Explain why ,the tip of a sewing neddis is sharp.

Watch Video Solution

90. Why is the pressure on the ground more when a man is walking than when he is standing?

Watch Video Solution

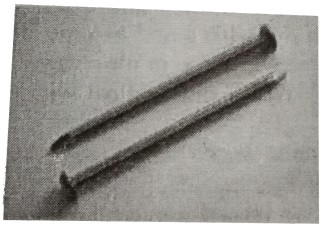
91. Explain why when a person stands on a cushion , the depression is much more than when he lies down on it .

Watch Video Solution

92. Use your ideas about pressure to explain why it is easier to walk on soft sand if you have flat shoes tather than shoes with sharp heels.

Watch Video Solution

93. Explain why,a nail has a pointed tip .



The density of iron or steel is much higher than that of water, so an object made of

Watch Video Solution

94. Explain why, building and dams have wide foundations.

Watch Video Solution

95. Why do camels have large flat feet ?

A camel

A large flat foot of camel.

Watch Video Solution

96. A pressure of 10 Pa acts on an area of $3.0m^2$ .What is the force acting on the area ? What force will be exerted by the application of same pressure if the area is made one -third ?

Watch Video Solution

97. Calculate the density of an object of volume $3m^3$ and mass 9 kg .State whether this object will float or sink in water or more in water

.Give reason for your answer .

Watch Video Solution

98. (a) Write down an equation that defines density .

(b) 5 kg of meterial A occupy $20cm^2$ whereas 20 kg of material B occupy $90cm^2$.Which has the greater density : A or B

Watch Video Solution

99. Define density .What is the SI unit of density ?

(b) Define relative density .What is the SI unit of relative density ?

The density of turpentine is $840kg/m^3$.What will be its relative density ? (Density of water $= 1000kg/m^3$)

Watch Video Solution

100. (a) Define pressure .

(b) What is the relation between pressure force and area ?

(c) Calculate the pressure when a force of 200 N is exerted on an area of :

$10m^2$

$5m^2$

Watch Video Solution

101. (a) How does a boat float in water ?

A piece of steel has a volume of $12cm^3$, and a mass of 96 g. What is its density :

(i) $\in g/cm^2$

(ii) $\in kg/m^3$

Watch Video Solution

102. An object weighs 10N in air. When immersed fully in liquid, it weighs only 8N. The weight of the liquid displaced by the object will be:

A. 2 N

B. 8 N

C. 10 N

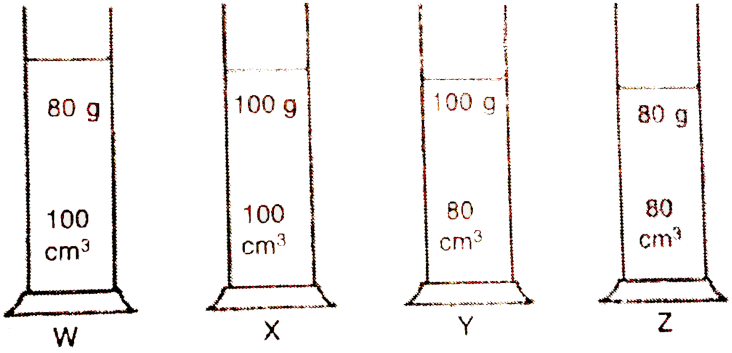
D. 12 N

Answer: A

Watch Video Solution

103. The diagrams represent four measuring cylinders containing liquids. The mass and volume of the liquid in each cylinder are stated. Which two measuring cylinders could contain an identical

liquid?



A. W and X

B. W and Y

C. X and Y

D. X and Z

Answer: D

Watch Video Solution

104. Consider the following information in respect of four objects A, B, C, and D

Object	Density (kg/m^3)	Volume (m^3)	Mass (kg)
A		2	4000
B	8000	4	
C	2000		1000
D		4	2000

Which object would float on water?

A. A

B. B

C. C

D. D

Answer: D

Watch Video Solution

105. If two equal weights of unequal volumes are balanced in air, what will happen when these are completely dipped in water?

Watch Video Solution

106. Two different object are completely immersed in water and undergo same loss in weight. Is it necessary that the weights of these objects in air be also the same?

Watch Video Solution

107. State the universal law of gravitation.

Watch Video Solution

108. Write the formula to find the magnitude of the gravitational force between the Earth and an object on the surface of the Earth.

Watch Video Solution

109. What do you mean by free fall?

Watch Video Solution

110. What do you mean by acceleration due to gravity?

Watch Video Solution

111. Write the differences between mass and weight of an object.

Watch Video Solution

112. Why is the weight of an object on the Moon $(1/6)$th its weight on the Earth?

Watch Video Solution

113. Why is it difficult to hold a school bag having strap made of thin and strong string?

Watch Video Solution

114. What do you mean by buoyancy?

Watch Video Solution

115. Why does an object float or sink when placed on the surface of water?

Watch Video Solution

116. You find your mass to be 42 kg on a weighing machine. Is your mass more or less than 42 Kg?

Watch Video Solution

117. You have a bag of cotton and an iron bar, each indicating a mass of 100 kg when measured of a weighing machine. In reality, one is heavier than the other. Can you say which one is heavier and why?

Watch Video Solution

118. How does the force of gravitation between two objects change when the distance between them is reduced to half ?

Watch Video Solution

119. Gravitational force acts on all objects in properties to their masses. Why then, a heavy object does not fall faster than a light object?

Watch Video Solution

120. What is the magnitude of the gravitational force between the Earth and a 1kg object on its surface ? (Mass of the earth is 6×10^{24} kg and radius of the Earth is $6.4 \times 10^{6} m$).

Watch Video Solution

121. The earth attracts the moon with the same force with which the moon attracts the earth .This is beacause

Watch Video Solution

122. If the moon attracts the earth, why does the earth not move towards the moon?

Watch Video Solution

123. What happens to the force between two object, if

(i) the mass of one object is doubled ? (ii) the distance between the object is doubled and tripled?

(iii) the masses of both object are doubled?

Watch Video Solution

124. What is the importance of universal law of gravitation?

Watch Video Solution

125. What is the acceleration of free fall?

Watch Video Solution

126. What do we call the gravitational force between the earth and an object ?

Watch Video Solution

127. Amit buys few grams of gold at the poles as per the instruction of one of his friends. He hands over the same when he meets him at the equator. Will the friend agree with the weight of gold bought ? If not, why ? [Hint. The value of g is greater at the poles than at the equater.]

Watch Video Solution

128. Why will a sheet of paper fall slower than one that is crumpled into a ball?

Watch Video Solution

129. Gravitational force on the surface of the moon is only $1/6$ as gravitational force on the earth. What is the weight in newtons of a 10kg object on the moon and on the earth?

Watch Video Solution

130. A stone is released from the top of a tower of height 19.6m. Calculate its final velocity just before touching the ground.

Watch Video Solution

131. A stone is thrown verticaly upward with an initial velocity of $40m/s$. Taking $g = 10m/s^2$, find the maximum height reached by the stone. What is the net displacement and the total distance covered by the stone?

Watch Video Solution

132. Calculate the force of gravitation between the earth the sun, given that the mass of the earth $= 6 \times 10^{24}$kg and mass of the sun $= 2 \times 10^{30}$kg. The average distance between the two is $1.5 \times 10^{11}m$.

Watch Video Solution

133. A stone is allowed to fall from the top of a tower 100m high and at the same time another stone is projected vertically upwards from

the ground with a velocity of $25m/s$. Calculate when and where the two stone will meet.

Watch Video Solution

134. A ball thrown up verically returns to the thrower after 6 s. Find (a) the velocity with which it was thrown up. (b) the maximum height it reaches, and (c) its position after 4 s.

Watch Video Solution

135. In what direction does the buoyant force on an object immersed in a liquid act?

Watch Video Solution

136. Why does a block of plastic released under water come up to the surface of water?

Watch Video Solution

137. The volume of 50 g of a substance is 20 cm^3. If the density of water is $1\frac{g}{cm^3}$, will the substance float or sink?

Watch Video Solution

138. The volume of 500 g sealed packet is 350 cm^3. Will the packet float or sink if the density of water is $1\frac{g}{cm^3}$? What will be the mass of the water displaced by this packed?

Watch Video Solution

Very S Question

1. Name the scientist who explained the motion of planets on the basis of gravitational force between the sun and planets

View Text Solution

2. Which of the kepler's laws of planetary motion led Newton to establish the inverse-sguare rule for gravitational force between two bodies

Watch Video Solution

3. What type of force is involved in the formation of tides in the sea ?

View Text Solution

4. State whether the following statements are true or false:

(a) A falling stone also attracts the earth.

(b) The force of gravitation between two objects depends on the nature of medium between them.

(c) The value of G on the moon is about one-sixth $\left(\frac{1}{6}\right)$ of the value of G on the earth.

(d) The acceleration due to gravity acting on a freely falling body is directly proportional to the mass or the body.

(e) The weight of an object on the earth is about one-sixth of its weight on the moon.

Watch Video Solution

5. Fill in the following blanks with suitable words:

(a) The acceleration due to gravity on the moon is about .

(b) In order that the force of gravitation between two bodies may become noticeable and cause motion, one of the bodies must have

an of that on the earth. extremely large

(c) The weight of an object on the earth is about .....of its weight on the moon.

(d) The weight of an object on the moon is about

(e) The value of g on the earth is about .... of that on the moon.

Watch Video Solution

6. Write the common unit of density.

Watch Video Solution

7. What is the density of water in SI units

Watch Video Solution

8. What is the value of relative density of water

Watch Video Solution

9. State the units in which pressure is measured .

View Text Solution

10. Name the principle which gives the magnitude of buoyant force acting on an object immersed in a liquid

View Text Solution

11. The relative density of mercury is ?

Watch Video Solution

12. What is the scientific name of the 'upward force acting on an object immersed in a liquid ?

View Text Solution

13. What causes buoyant force (or upthrust) on a boat ?

Watch Video Solution

14. Why does a block of wood held under water rise to the surface when released ?

View Text Solution

15. Fill in the following blanks with suitable words :

(a) Force acting on a units area is called .....

(b) It is the .....force which makes objects appear lighter in water

(c) A heavy ship floats in water because its .....density is less than that of water .

(d) In fluids (liquids and gases), pressure acts in .....direction ,and pressure .....as the depth increases,

(e) In order to sink in fluid ,the density of an object must be .....than the ..... of the fluid .

(f) snow shoes work by spreding out a preson's .....over a much bigger .....

Watch Video Solution

Short Ans T Que

1. State two applications of universal law of gravitation.

Watch Video Solution

2. A mug full of water appears light as long as it is under water in the bucket than when it is outside water . ? Why

View Text Solution

3. What happens to the buyoant force as more and more volume of a solid object is immersed in a liquid ? When does the buoyant force becomes maximum ?

Watch Video Solution

4. Explain why, wooden (or concrete) sleeps are kept below the railway line .

Watch Video Solution

5. Explain why, show shoes stop you from sinking into soft snow.

Watch Video Solution

6. Why does a ship made of iron and steel float in water whereas a small piece of iron sinks in it ?

View Text Solution

7. Name these forces,

(a) the upward push of water on a submerged object

(b) the force which wears away two suefaces as they move over one another

(c) the force which pulled the apple off Isaac Newton's tree:

(d) the force which stops you falling through the floor.

Watch Video Solution

8. A girl is wearing a pair of flat shoes. She weight 550 N. The area of contact of one shoe with the ground is $160cm^2$.What pressure will be exerted by the girl on the ground if she stands on two feet ?

Watch Video Solution

9. An object weigh less in water 500 grams in air .This object is then fully immersed in water .State whether this will float or sink in water of more in water of more in water .Give reason for your answer.

View Text Solution

Long Ans T Q

1. What is the relation between mass and weight of a body ?

Watch Video Solution

Watch Video Solution

2. Is the acceleration due to gravity of earth g a constant ? Discuss.

Calculate the acceleration due to gravity on the surface of a satellite having a mass of 7.4×10^{22} and a radius of 7.4×10^{22} kg and a radius of $1.74 \times 10^{6} mG\left(= 6.7 \times 10^{11} Nm^{2} / kg^{2} \right)$.Which satellite do you think it could be ?

View Text Solution

3. Define buoyant force. Name two factor on which bouyant force depens.

What is the cause of buoyant force ?

Watch Video Solution

4. A floating boat displaces water weighing 6000 newtons .

(i) What is the buoyant force on the boat ?

(ii) What is the weight of the boat ?

Watch Video Solution

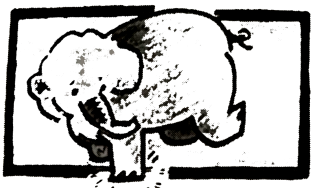
5. What are fluids ? Name two common fluids.

(b) State Archimedes' principle.

(c) When does an object float or sink when placed on the surface of a liquid?

View Text Solution

6. An elephant weighing 40,000 N stands on one foot of area $1000cm^2$ whereas a girl weighing 400 N is standing on one 'stiletto heel of area $1cm^2$



(a) Which of the two, elephant or girl, exerts a

(b) What pressure is exerted on the ground by the elephant standing

(c) What pressure is exerted on the ground by the girl standing

(d) Which of the two exerts larger pressure on the ground : elephant or girl?

(e) What is the ratio of pressure exerted by the girl to the pressure exerted by the elephant ?

Watch Video Solution

Mcq

1. The value of acceleration due to gravity of earth :

A. is the same on equator and poles

B. is the least on poles

C. is the least on equator

D. increase from pole to equator

Answer: c

View Text Solution

2. The partics are placed at stone

View Text Solution

3. An apple falls from a tree because of gravitational between the earth and apple. If F_1 is the magnitude of force exerted by the earth on the apple and F_2 is the magnitude of force exerted by apple on earth, then

A. F_1 is very much greater than F_2

B. F_2 is very much greater than F_1

C. F_1 is only a little greater than F_2

D. F_1 and F_2 are exactly equal

Answer: D

Watch Video Solution

4. A rectangular wooden block has length, breadth and height of 50 cm, 25 cm and 10 cm, respectively. This wooden block is kept on ground is three different ways trun by trun .Which of the following is the correct statement about the pressure exerted by this block on the ground?

A. the maximum pressure is exerted when the length and breadth form the base

B. the maximum pressure is exerted when length and height form the base

C. the maximum pressure is exerted when breadth and height form the base

D. the minimum pressure is exerted when length and height form the base

Answer: C

View Text Solution

5. An object is put turn in three liquids having different densities. The object floats with $\frac{1}{9}$, $\frac{2}{11}$ and $\frac{3}{7}$ parts of its volume outside the liquid surface in liquids of densities d_1,d_2 and d_3 respectively. Which of the following statements is correct?

A. $d_1 > d_2 > d_3$

B. $d_2 > d_3 > d_1$

C. $d_1 < d_2 < d_3$

D. $d_3 > d_2 > d_1$

Answer: C

Watch Video Solution

6. A metal in which even iron can float is :

A. Sodium

B. magnesium

C. mercury

D. manganese

Answer: C

Watch Video Solution

7. Four balls,A,B,C,D displace 10 mL ,24 mL,15 mL, and 12 mL of a liquid respectively ,when immersed completely.The ball which will undergo the maximum apparent loss in weight will be :

A. A

B. B

C. C

D. D

Answer: B

View Text Solution

8. The relative densities of four liquids P,Q,R and S are 1.26,1.0,0.84, and 13.6 respectively .An object is floated in all these liquids ,one by

one .In which liquid will is maximum volume submerged under the liquid ?

A. P

B. Q

C. R

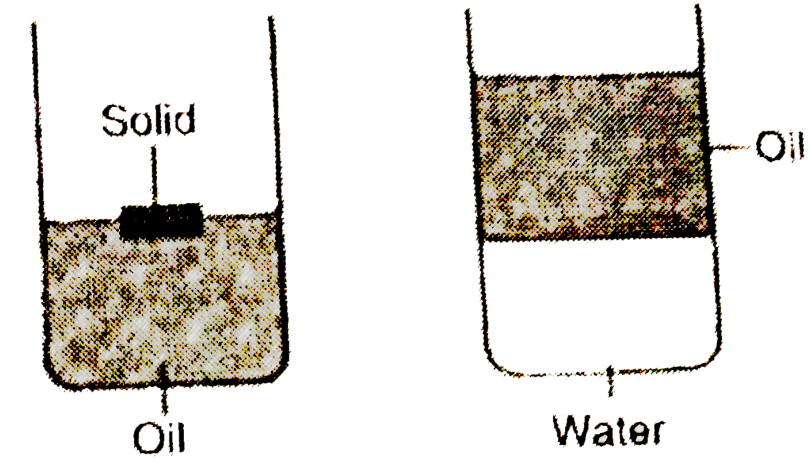
D. S

Answer: C

View Text Solution

9. A solid of density $900kg/m^3$ floats in oil as shown in the given diagram. The oil floats on water of density $1000kg/m^3$ as shown.The

density of oil in kg/m^3 could be:



A. 850

B. 950

C. 950

D. 1050

Answer: C

View Text Solution

10. The density of water is $1000kg/m^3$ and the density of copper is $8900kg/m^3$. Which of the following statements is incorrect ?

A. $(a) = \dfrac{\text{The density of a certain volume of copper}}{\text{The density of the same volume of water}} = 8.9$

B. $(a) = \dfrac{\text{The density of a certain volume of copper}}{\text{The density of the same volume of water}} = 8.9$

C. $(a) = \dfrac{\text{The density of a certain volume of copper}}{\text{The density of the same volume of water}} = 8.9$

D. $(a) = \dfrac{\text{The density of a certain volume of copper}}{\text{The density of the same volume of water}} = 8.9$

Answer: B

View Text Solution

Thinking Skills Hots

1. A coin and a piece of paper are dropped simultaneously from the same height .Which of the two will touch the ground first ? What will

happen if the coin and the piece of paper are dropped in vacuum ? Gives reasons for your answer .

View Text Solution

2. A stone and the earth attract each other with an equal and opposite force.Why then we see only the stone falling towards the earth but but not the earth rising towards the stone ?

Watch Video Solution

3. What is the actual shape of the orbit of a planet around the sun ? What assumption was made by Newton regarding the shape of an orbit of a planet around the sun for deriving his inverse square rule from Kepler's third law of planetary motion ?

Watch Video Solution

4. The values of g at six,distance A,B,C,D and F form the surface of the earth are found to be $3.08m/s^2, 9.23m/s^2, 0.57m/s^2, 7.34m/s^2, 0.30m/s^2$ and $1.49m/s^2$,respectively.

A. Arrange these values of g according to the increasing distances from the surface of the earth (keeping the value of g nearest to the surface of the earth first)

B. If the value of distance F be 10000 km from the surface of the earth, state whether this distance is deep inside the earth or high up in the sky. Give reason for your answer.

C.

D.

Answer: **(a)**
$9.23m/s^2, 7.34m/s^2, 3.08m/s, 1.49m/s2, 0.57m/s^2, 0.30m/s^2$
(b) This distance F of 10000 km is high up in the sky ; The distance of

10000 km cannot be deep inside the earth because the radius of earth is only about 6400 km and the value of g at the centre of earth becomes 0 (zero).

View Text Solution

5. A body Eoats in kerosene of density $0.8 \times 10^3 kg/m^2$ up water of dersity $1.010^3 kg/m^2$, will it sink more or less ? Give reason for your answer.

View Text Solution

6. Giving reasons and state the reading on a spring balance when it is attached to a floating block of wood which weighs 50 g in air.

View Text Solution

7. If a fresh egg is put into a beaker filled with water, it sinks On dissolving a lot of salt in the water, the egg begins to rise and then floats. Why ?

Watch Video Solution

8. A beaker full of water is suspended from a spring balance. Will the reading of the balance change:

If a cork is placed in water ?

If a piece of heavy metal is placed in it ?

Give the reasone for your answer

View Text Solution

9. When a golf ball is lowered into a measuring cylinder containing water, the water level rises by $30cm^3$ when the ball is completely

submerged. If the mass of ball in air is 33 g find its density

View Text Solution

10. A boy gets into a floating boat ?

(a) What happens to the boat ?

(b) What happens to the weight of water displaced ?

What happens to the buyount force on the boat ?

Watch Video Solution

11. A $\frac{1}{2}$ kg sheet of tin sinks in water but if the same sheet is converted into a box or boat, it floats. why ?

Watch Video Solution

Ncert Book

1. A ball is thrown vertically upwards with a velocity of $49m/s$. Calulate

(i) The maximum height to which it rises,

(ii) the total time it takes to return to the surface of the earth.

Watch Video Solution