PHYSICS

BOOKS - KUMAR PRAKASHAN KENDRA PHYSICS (GUJRATI ENGLISH)

GRAVITATION

Intext Questions And Answers

1. State the universal law of gravitation.

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

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3. What do you mean by free fall ?

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

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5. What are the difference between the mass of an object and its weight?

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6. Why is the weight of an object on the moon $\frac{1}{6}th$ of its weight on the earth?

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

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8. What do you mean by buoyancy?

9. Why does an object float or sink when placed on the single of water ?

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

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

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Questions And Answers

1. What is centripetal force ?

2. What is the SI unit of G, the universal gravitational constant ?

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3. What is the value of G?

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4. Who determined the value of G?

5. Write the mathematical expression for the calculation of the magnitude of gravitational force between the earth and an object of mass m on the surface of the earth.

6. A stone describing a circular path has constant speed or constant velocity?

7. Which force is required to keep a body in uniform circular motion ?

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8. Which forces generate tides in ocean ?

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9. The value of G on the surface of the earth is $6.673 \times 10^{-11} Nm^2 kg^{-2}$. What is its value on the moon ?

10. Which of the following will be greater ? Foree of attraction of the earth on a body of mass 1 kg or force of attraction of a body of mass 1 kg on the earth.

11. Due to which force does the moon revolve around the earth on circular path?

12. The earth and the moon are attracted to each other by gravitational force. Does the earth attract the moon with a force that is greater or smaller or the same as the force with which the moon attracts the earth ? Why?

13. What happens to the force between two objects, if

(i) the mass of one object is doubled ?

(ii) the distance between the two objects is doubled ?

(iii) the distance between the two objects is tripled ?

(iv) the masses of both the objects are doubled?

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14. State two factors on which the gravitational force between two objects depends.

15. The gravitation force between two objects is F. How will the force change when the distance between them is reduced to $\frac{1}{4}th$?

16. When a body is thrown vertically upward, at maximum height what will be its final velocity ?

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17. Which type of motion is described by a freely falling body ?

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18. What is the value of g on the surface of the earth ?

19. What will be the mass of a body on the moon, if its mass on the earth is 60 kg ? (the value of g on the moon is th the value Hof g on the earth.)

20. What is the weight of the body on the moon, whose weight on the earth is 120 N?

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

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22. Define : Thrust

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23. Define : Pressure

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24. How can the pressure be doubled ?

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25. What is the SI unit of pressure ?

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

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

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28. What is the pressure acting on a surface of area 0.02 m^2. due to a thrust of 25 N ?

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29. Which instrument is used to determine the density of milk?

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30. What is the use of hydrometer?

31. What is relative density ?

32. Unit of relative density is

Choose The Correct Option

1. If an object is falling freely from certain height towards the surface of earth, its total mechanical enrgy ....

    A. will move upwards with accelerated motion.

    B. will move downwards with accelerated motion.

    C. will move downwards with constant velocity.

    D. will move upwards with constant velocity.

Answer: A::C::D

2. The mass of an object.

    A. varies at different locations.

    B. remains constant at any location.

    C. can be measured using a spring balance.

    D. is in the direction of gravitational force.

Answer: A::C

3. The density of water is.........

A. $1 kgm^{-3}$

B. $1000 kgm^{-3}$

C. $1000 gcm^{-3}$

D. $19300 kgm^{-3}$

Answer: A::C

4. If the relative density of an object is more than that of water, then that object will.....

A. sink in water

B. float on water

C. dissolve in water

D. not get wet in water.

Answer: A

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5. The relative density.... (has unit of kg m – 3, has unit of g cm – 3, has unit of kg m – 2, is unitless.)

A. has unit of $kg\ m^{-3}$

B. has unit of $g\ cm^{-3}$

C. has unit of $kg\ m^{-2}$

D. is unitless.

Answer:

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6. The increase in velocity of a freely falling body in one second is

A. $9.8ms^{-2}$

B. $9.8ms^{-1}$

C. $-9.8ms^{-2}$

D. $-9.8ms^{-1}$

Answer: A

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7. The mass of an object of 6 kg, on the surface of moon is

    A. 1 kg

    B. 36 kg

    C. 6 kg

    D. $\dfrac{1}{6} kg$

Answer:

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8. Practically the value of G for the first time was measured by

A. Newton

B. Cavendish

C. Archimedes

D. Galileo

Answer: B

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9. What is the value of G?

A. $6.67 \times 10^{-11} Nm^2 kg^{-1}$

B. $6.67 \times 10^{-11} Nm^2 kg^{-2}$

C. $6.67 \times 10^{-11} Nm^2 kg^{-2}$

D. $6.67 \times 10^{-11} Nmkg^{-2}$

Answer: A::B

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10. The relation between G and g is......

A. $g = \dfrac{GM_e^2}{R_e^2}$

B. $g = \dfrac{GM_e}{R_e^2}$

C. $g = \dfrac{GM_e}{R_e}$

D. $g = \dfrac{GM_e^2}{R_e}$

Answer: B

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11. If the mass and radius of a planet are twice the mass and radius of the earth respectively, what would be the value of gravitational acceleration the surface of that planet?

A. $9.8ms^{-2}$

B. $19.6ms^{-2}$

C. $4.9ms^{-2}$

D. $2.45ms^{-2}$

Answer: C

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12. A stone falling freely on the terrace of the building takes 4s to reach the ground. What would be the height of his building?

A. 9.8m

B. $(2 \times 9.8)m$

C. $(4 \times 9.8)m$

D. $(8 \times 9.8)m$

Answer: D

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13. If a ball is thrown in upward direction it attains maximum height of 7.2 m. What would be the initial velocity of this ball?

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

A. $7.2ms^{-1}$

B. $14.4ms^{-1}$

C. $12ms^{-1}$

D. $144ms^{-1}$

Answer: C

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14. An object having mass 1 kg is falling freely. Its velocity is $29.4ms^{-1}$ after time t= 3s, then what would be its velocity after t =4s?

A. $29.4ms^{-1}$

B. $9.8ms^{-1}$

C. $39.2ms^{-1}$

D. $19.6ms^{-1}$

Answer: C

15. If a piece of stone is brought to earth from the surface of moon, then ...

   A. mass of the stone would change.

   B. weight of the stone would change.

   C. mass and weight, both of the stone would change.

D. mass and weight, both of the stone remain constant.

Answer: B

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16. If the distance between two objects is halved, what change would occur in force acting between them?

A. Would be double

B. Would be one-fourth

C. Would be half

D. Would be four times

Answer: D

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17. At which of the following places locations the magnitude of g is the most?

A. At the top of the Mount Everest

B. At the equation

C. All the Antarctica

D. In deep well

Answer: C

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18. What would be the weight an object on the moon, whose weight on earth is 36N?

A. 5N

B. 6N

C. 30N

D. 180N

Answer: B

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19. If pressure is to be doubled keeping the force acting an the surface constant, what would be the area of the surface required?

A. Double

B. Half

C. Four times

D. Change should not be done in the area

of the surface

Answer: B

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20. Two objects of different masses fall freely from certain height towards the surface of the moon, then ...

A. their velocity would be the same any time.

B. their acceleration would be different.

C. magnitude of the force acting on them would be the same.

D. their inertia would change.

Answer: A

21. The magnitude of gravitational acceleration

of the earth

    A. would be equal at the equator and poles.

    B. would be minimum at poles.

    C. would be minimum at equator.

D. increases on going from poles to the equator.

Answer: C

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22. The distance between two objects is doubled. The gravitational force acting between them would be............ (Initial gravitaional force is F)

A. $\dfrac{F}{4}$

B. $\dfrac{F}{2}$

C. F

D. 2F

Answer: A

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23. A boy moves a stone tied to a string on horizontal circular path. If the string breaks, then the stone

A. would continue to move on the original circular path.

B. would move on a linear path towards the centre of the circle

C. would start moving on a linear path in the direction of tangent drawn at the point of a circle.

D. would start moving away from the centre in radial direction at the point of a circle.

Answer: C

24. An object is placed in three liquids having different densities d_1, d_2 and d_3 one after the other. As a result $\dfrac{1}{9}$ part. $\dfrac{2}{11}$ part and $\dfrac{3}{7}$ part of the size of this okicet remain outside the surface of the liquid respectively. Select the correct relationship from the following

A. $d_1 > d_2 > d_3$

B. $d_1 > d_2 < d_3$

C. $d_1 < d_2 > d_3$

D. $d_1 < d_2 < d_3$

Answer: D

25. In the formula $F = \dfrac{GMm}{d^2}$ . . . .

A. the magnitude of G is dependent on the value of g at that place.

B. G is used only when one of the two objects is the earth.

C. the magnitude of G is maximum at the

poles of the earth.

D. G is a universal gravitational constant.

Answer: A::C

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26. Universal law of gravitation is used only

when the gravitational force ...

A. exists between the earth and a particle.

B. exists between the earth and the sun.

C. exists between any two objects.

D. exists between to electrical charged

objects.

Answer: A::B::C

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27. The magnitude of 'G' as per universal law of

gravitation ...

A. is dependent on the mass of the earth.

B. is dependent on the radius of the earth.

C. is dependent on both the mass and radius of the earth.

D. is independent to the mass and radius of the earth.

Answer: A::D

28. The atmosphere of the earth is attached with the earth due to ....

A. gravitational force

B. wind

C. cloud

D. magnetic field of the earth

Answer: A::C

29. The force existing between two particles having mass 1 unit and at a distance of 1 unit from each other is called

   A. gravitational potential

   B. gravitational acceleration

   C. intensity of gravitational field

   D. universal constant of gravitation

Answer: D

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30. The weight of a given object on the centre of the earth of radius R_e is..........

   A. zero

   B. infinite

   C. R_e, times to that on the surface of the earth

   D. $\dfrac{1}{R_e^2}$ times to that on the surface of the earth

Answer:

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31. Weight of an object in air is 10 N, when it is fully immersed in water its weight is 8N. The weight of liquid displaced by the object would be .... N.

A. 2

B. 8

C. 10

D. 12

Answer: B

32. A girl is standing on a box having length 60 cm. breadth 40 cm and height 20 cm. In which of the following case the pressure acting by the girl on the box would be maximum ?

A. If the base of the box is made of the length and breadth.

B. If the base of the box is made of the breadth and height.

C. If the base of the box is made of length

and height.

D. In all given three cases.

Answer: B

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33. An apple detached from the tree falls on

the earth. The force acting on the apple by the

earth is F_1 and that acting on the earth by the

apple is F_2, then

A. $F_1 >\ > F_2$

B. $F_2 >\ > F_1$

C. $F_1 > F_2$

D. $F_1 = F_2$

Answer: D

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Fill In The Blanks

1. ....is the mathematical form of universal law of gravitation.

2. An object of mass 2 kg falls freely. At the end of t= 4s its velocity would be ms^{-1}.......

3. A ball is thrown upward and attains the maximum height 10 m. The initial velocity of this ball would be ....ms^{-1}

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4. A stone of mass 100 g is thrown upward with velocity $49ms^{-1}$. This stone will fall on the earth after.............s

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5. The magnitude of gravitational acceleration on the moon is..............ms^{-1}.

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6. The weight of an object on the earth is 60 N, then its weight on the moon would be ....N.

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7. A ball is thrown upward and attains the maximum height 10 m. The initial velocity of this ball would be ....ms^{-1}

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8. The mass of an object on the earth is 10 kg. then its mass on the moon would be...............kg.

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9. The mass of an object is 30 kg, then Its weight on the moon would be ....N.

10. The weight of an object on the earth is 98 N, then its mass would be .... kg

11. A force 100N is applied perpendicularly on a surface of $2m^2$, then the pressure exerted on it would be .....Nm^{-2}.

12. The mass and volume of a solid steel cuboid is 156 g and $20cm^3$ respectively, then its density would be .....gcm^3.

13. The earth is .... about its own (imaginary) axis in space. (revolving, rotating, moving with constant velocity)

14. The earth and other planets ....around the sun. (revolve, rotate, move with constant velocity)

15. An object moving in the opposite direction (upward direction) of the gravitional force of the earth performs (accelerated motion, motion mich constant velocity: retarded motion)

16. Weight of a body is............. on the equator than its weight on the poles. (slightly more slightly less, 9.8 times)

17. The direction of weight of an object is in (upward direction, in the direction of gravitional force, in north direction)

18. 1 pascal

$$= 1.......... ms^2, Nm^{-2}kg^{-2}, Nm^{-2}, Nm^2kg^{-2}$$

19. The initial velocity of a freely falling object $(\text{more}, \ 9.8ms^{-1}. \text{Zero})$ is

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20. The distance between two objects is doubled. The gravitational force acting between them would be........... (Initial gravitaional force is F)

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

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22. The buoyant force acting on a object floating on the surface of the liquid is ....the weight of the objects. (less than, more than equal to)

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23. If the mass of object is 42kg on earth then what is the weight of object on moon?

24. The mass of an object whose weight on the earth is 490 N is ....kg. (40, 50, 490)

25. A ball falling freely from the terrace of a building takes 3s to reach the ground, then the height of this tower is..........m. (29.4, 44.1, 39.2)

26. ....principle/law is used in designing ships and submarines. (Archimedes', Newton's first, Pascals)

27. .... is used to determine the purily of a sample of milk. (Hydrometer, Lactometer, Odometer)

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1. The acceleration of a free falling object does not depend on its mass.

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2. The value of gravitational acceleration g for the first time was measured by ....

A. Cavendish.

B. Einstein

C. Thomson

D. Newton

Answer:

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3. The distance between two objects is doubled. The gravitational force acting between them would be............ (Initial gravitaional force is F)

4. The gravitational constant G has unit.

5. Mass is a vector quantity.

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6. The unit of weight is newton.

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7. The moon moves around the earth. This is called rotation.

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8. The weight of an object increase on going from equator to poles .

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9. The mass of an object is measured by a simple physical balance.

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10. The mass of an object.

11. The unit of mass of an object is kilogram (kg)

12. A solid piece of iron floats on mercury filled in a vessel.

13. The weight of an object is more at equator as compared to that at polar region. True/ False?

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14. The gravitational acceleration g is neither universal nor constant.

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15. The resistance of each side of an equilateral triangle is 3 ohm. Calculate the equivalent resistance between ends of a side.

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16. Weight is a vector quantity.

▶ **Watch Video Solution**

17. The mass of an object at the polar region is the maximum.

18. Two objects of different masses fall freely from certain height towards the surface of the moon, then ...

19. Pascal is a unit of thrust?

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20. Relative density of an object

$$= \frac{\text{Density of water}}{\text{Density of object}}$$

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21. The buoyant force acting on a body partly immersed in liquid, depend on the total

volume of the object.

Short Questions

1. State two factors on which the gravitational force between two objects depends.

2. If a planet existed, whose mass and radius were both half of that of the earth, what would be the acceleration due to gravity at the surface of the planet in terms of that on the surface of the earth ?

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

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

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

6. What is the acceleration of free fall ?

7. Gavitational force acts on all objects in proportion to their masses. Why then, a heavy objects does not fall faster than a light object ?

8. What is the magnitude of the gravitational force between the earth and a 1 kg object on its surface ?

(Mass of the earth is 6×10^{24} kg and radius of the earth is $6.4 \times 10^6 m$)

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9. How will the weight of a body of mass 100 kg change, if it is taken from the equator to the poles ?

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10. Amit buys some gram of gold on North pole as his friend told him. He sold this gold to his friend on equator .Will his friend be happy with the weight of gold that he bought ? Why .

(Hint : The magnitude of g on the poles is more than that at equator).

11. Gravitational force on the surface of the moon is only $\dfrac{1}{6}$ times as strong as gravitational force on the earth. What is the weight in newton of a 10 kg object on the moon and on the earth ?

12. A ball is thrown vertically upwards with a velocity of 49 ms -- Calculate fi) the maximum height to which it rises, (ii) the total time it takes to return to the surface of the earth.

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

14. A stone is thrown vertically upward with an initial velocity of $40ms^{-1}$. Taking $g = 10ms^{-2}$. find the maximum height

reached by the stone. What is the net displacement and the total distance covered by the stone ?

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

16. If the moon attract the earth why does the earth not move towards the moon?

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17. Define : Thrust

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18. What is pressure? State its unit. Is pressure a scalar or a vector quantity?

19. A force of 100 N acts on a surface area 25 cm^2. Calculate the pressure. Calculate the changed pressure, if the force is now reduced to 25 N.

20. What is the difference between the pressure exerted by a solid and a fluid ?

21. Where do you observe Archimedes principle in daily life ? Give two examples. (AS_7)

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22. Explain relative density.

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23. The volume of 50g of a substance is $20cm^3$. If the density of water is $1gcm^{-3}$, will the substances float or sink?

24. The volume of a 500 g sealed packet is 350 cm^3 Will the packet float or sink in water if the density of water is 1gcm^3? What will be the mass of the water displaced by this packet?

25. The dimensions of wooden black are $2m \times 0.125m \times 0.10m$. If the relative density of wood is 0.6, calculate the mass of wooden block Density of water is $10^3 kgm^{-3}$.

26. if a particle performs SHM then its given by $y = 20\sin(20t - 6x)$. what is the value of frequency?

27. if a particle performs SHM then its given by $y = 150\sin(40t - 12x)$. what is the value of Amplitude?

28. if a particle performs SHM then its given by $y = 30\sin\left(60\pi t - \dfrac{4}{\pi}x\right)$. what is the value of Amplitude frequency and wavelength?

29. The tyres of heavy vehicles are kept broad.

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30. It is difficult to insert a blunt nail in wooden block.

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31. if the wire's length is increases by 10% and find the change in resistance?

32. It is easier to cut vegetables with a sharp knife than with a blunt knife.

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33. A bucket full of water appears heavier when is brought outside water.

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34. A piece of iron (Fe) floats in a vessel filled with mercury (Hg) but a piece of gold (Au) of the same mass sinks in it.

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35. A Voltage (ship) made from steel float in sea water but a small pin a steel sinks in sea water.

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36. It is easier to walk on soft sand with flat shoe than a pencil heeled shoe.

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37. The camel is heavier than man, yet a camel walks easily on sand in desert while it is difficult for a man to walk on the sand.

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Match The Following Properly

1. Match the following

Column I	Column II
1. SI unit of mass	a. N
2. SI unit of weight	b. $N\,m^{-2}$
3. SI unit of density	c. kg
4. SI unit of pressure	d. $kg\,m^{-3}$

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2. Match the following

Column I	Column II
1. SI unit of 'G'	a. N
2. SI unit of 'g'	b. $N\,m^2\,kg^{-2}$
3. Unit of relative density	c. $m\,s^{-2}$
4. Unit of buoyant force	d. Unitless (No unit)

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3. Universal constant of gravition G and Gravitational acceleration g.

4. Using Newton's universal law of gravitation and second law of motion, find the mathematical expression for acceleration due to gravity on the surface of any planet.

5. Mona weighs 423N on the earth and 1000N on the planet Jupiter. What is the gravitational acceleration on the Jupiter? (The value of g on the earth is $10ms^{-2}$).

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6. 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 $25ms^{-1}$. Calculate when and where the two stones will meet.

7. A ball thrown up vertically returns to the thrower after 6s. Find

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

(b) the maximum height it reaches and

(c) its position after 4s.

8. Differentiate between density and relative density. What is the density of silver given that its relative density is 10.3?

9. A block of wood of mass 6kg and dimensions $50cm \times 30cm \times 10cm$ is placed on a table top. Find the pressure exerted, if the block lies on the table top with sides of dimensions, (a) $50cm \times 30cm$ (b) $30cm \times 10cm$.

10. State Kepler's laws of planetary motion.

11. While passing by a pond, some students saw a drowning man sereaming for help. They alerted another passer by, who immediately threw an inflated rubber tube in the pond. The man was saved.

(i) Why did the passer-by use inflated rubber

Lube to save the drowning man?

(ii) Write the principle involved here.

(iii) The density of turpentine is 840 kg m^{-3}. What will be its relative density ? (Density of water is 1000 kg m^{-3}).

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Textual Examples Numericals

1. The mas of the earth is $6 \times 10^{24} kg$ and that of the moon is $7.4 \times 10^{24} kg$. If the distance

between the centres of the earth and the moon is $3.84 \times 10^5 km$, calculate the force exerted by the earth of the moon. $G = 6.7 \times 10^{-11} Nm^2 kg^{-2}$.

2. A car falls off a ledge and drops to the ground is 0.5s Let $g = 10ms^{-2}$ (for simplifying the calculations).

(i) What is its speed on striking the ground?

(ii) What is its average during the 0.5s?

(iii) How high is the ledge from the ground?

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3. An object is thrown verticallly upward and rises to a height of 10m. Calculate (i) the velocity with which the object was thrown upwards and (ii) the time taken by the object to reach the highest point.

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4. Mass of an object is 10kg. What is its weight on the earth?

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5. An object weighs 10N when measured on the surface of the earth. What would be its weight when measured on the surface of the moon?

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6. A block of wood is kept on a table top. The mass of wooden block is 5kg and its dimensions are $40cm \times 20cm \times 10cm$. Find the pressure exerted by the wooden block on the table top if it is made to lie on the table top with its sides of dimensions (a) $20cm \times 10cm$ and $(b)40cm \times 20cm$.

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7. Relative density of silver is 10.8. The density of water is $10^3 kgm^{-3}$. What is the density of

silver in SI unit?

Additional Numerical For Practice

1. An apple of mass 150 g falls on the surface of the earth from a negligible height (in comparison with the radius of the carth) due to gravitation. Calculate the gravitational force acting between the apple and the earth. Also calculate the acceleration produced in both of

them due to the gravitational force.

$\left(\text{Mass of the earth} \ = 6 \times 10^{24} kg \right.$ and

Distance between the centre of the earth and

the apple $= 6.38 \times 10^6 m \Big).$

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2. Taking the mass of the moon to be

7.3×10^{22} kg and the radius to be 1740 km

calculate the acceleration due to gravity $'g_m'$

on the surface of the moon. Compare it with

the acceleration due to gravity $'g_e'$ on the earth.

3. A ball, when released from the top of a multistoried building reaches the bottom in 2s. Find the height of the building. Calculate the velocity of the ball when it reaches the earth. $\left(g = 9.8ms^{-2}\right)$

4. A ball thrown vertically upwards reaches the maximum height in 1s and then it returns. What would be the initial velocity of the ball ? At what maximum height would the ball have reached?

5. Weight of the body on the earth is 98 N. What would be the acceleration produced in the body when 30 N force is applied to it? $(g = 9.8ms^{-2})$

6. Relative density of silver is 10.8. The density of water is $10^3 kgm^{-3}$. What is the density of silver in SI unit?

7. Mass of the planet Jupiter is $2 \times 10^{27} kg$ and its radius is $7.14 \times 10^7 m$. Calculate

gravitational acceleration on its surface.

$(G = 6.67 \times 10^{-11} Nm^2 kg^{-2})$

8. The mass of an empty beaker of 500mL is 250g. What will be the densty of the empty beaker? (Neglect the volume of material of the beaker.) What will be the relative density of the empty beaker? If water of 100mL, 200mL, 300mL is filled in the beaker, find the density of beaker filled with water each time. What will be

the relative density of the beaker filled with water each time? Put the calculated values in hte given table. Density of water $= 1000 kg m^{-3}$, $1mL = 10^{-6} m^3$.

How much water must be filled in beaker so that it sinks in a bucket filled with water.

9. The dimensions of wooden black are $2m \times 0.125m \times 0.10m$. If the relative density

of wood is 0.6, calculate the mass of wooden block Density of water is $10^3 kgm^{-3}$.

10. Mona weighs 423N on the earth and 1000N on the planet Jupiter. What is the gravitational acceleration on the Jupiter? (The value of g on the earth is $10ms^{-2}$).

11. The weight of Raju on the moon is $\dfrac{1}{6}$ times than that on the earth. Raju can lift 15 kg of mass on the earth. How much maximum mass can he lift on the moon by applying the same force ?

12. Find the average density of the earth in the terms of g. G and R_e.

13. How does the mass of the given object depend on the mass and radius of the earth? In an imaginary case, if the diameter of earth becomes half to the present diameter, and mass becomes four times to the present mass, then what will be the effect on the weight of the object ?

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14. Two objects of same volume and masses m_1 and m_2 are allowed to fall freely from the

heights hi and h, respectively. Find the ratio of their time to reach earth's surface. Now, if (i) one of the objects is hollow and other is solid (ii) both of them are hollow. then what will be the effect on this ratio ?

15. A cube of length 5 cm is immersed first in water and then in common salt solution. In which case would the buoyant force be more on the cube? Why?

Now, if the length of the cube is made 4 cm and immersed in water, then in this new case what would be the effect on buoyant force on the cube as compared to the first case of water ?

16. A ball of mass 4 kg and density 4000 kg m^{-3} is fully immersed in water. The density of is $10^3 kgm^{-3}$. Find the buoyant force exerting on the ball. Take $g = 10ms^{-2}$

Question Based On Practical Skills With Answers

1. Jasmin is doing an experiment to find the pressure exerted by an iron cuboid of dimensions $3cm \times 6cm \times 15cm$ on loose sand. She will observe that iron cuboid exerts maximum pressure when it is placed on sand with its sides of dimensions.

A. $6cm \times 15cm$

B. $15 cm \times 3 cm$

C. $3 cm \times 6 cm$

D. $3 cm \times 15 cm$

Answer: B

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2. An iron cuboid of dimensions $12 cm \times 5 cm \times 2 cm$ is placed on a bed of sand. Which of its surface in contact will apply the maximum pressure on the sand band ?

A. $12cm \times 2cm$

B. $2cm \times 5cm$

C. $5cm \times 12cm$

D. the pressure will be the same of all surfaces.

Answer: B

3. A glass slab has dimensions $8cm \times 5cm \times 4cm$. If the density of glass is $2.5 \times 10^3 kgm^{-3}$, the pressure exerted by the glass slab when it rests on the surface with dimensions $5cm \times 4cm$ is........

   A. 0.8Pa

   B. 8.0Pa

   C. 2000Pa

   D. $2 \times 10^4 Pa$

Answer: C

4. State Archimedes' Principle. Why does a body undergo a loss in its weight when immersed in a liquid ?

5. The dimensions of a cuboidal block are $2.5m \times 2m \times 1.2m$. Its weight is 900 N. Find

the minimum pressure exerted by the block on the surface of its support.

6. Prashant carried out an experiment to the relative density of salty water. His observations are as follows:

(i) The weight of iron block in air= 3500 N

(ii) The weight of the iron block in water =3000 N

(iii) The weight of the iron block in salty water

=2960 N

What relative density of salty water did he find?

7. In an experiment on measurement of loss in weight of an iron ball immersed in tap water and salty water separately. When is the maximum loss in weight of iron ball observed ?

8. You are given a sphere of radius 2 cm. If you are asked to select a best suited spring balance to determine its weight, then what should be the range and least count of the spring balance? (The density of the sphere is $7 \times 10^3 kgm^{-3}$).

    A. Range 0-1000 gwt,least count - 5gwt

    B. Range 0-500 gwt,least count - 2.5gwt

    C. Range 0-250 gwt,least count - 2.5gwt

    D. Range 0-100 gwt,least count - 1.0gwt

Answer: C

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9. A block of gold and a block of wood both have the same volume. If both are submerged in water, then write in two points that which block will experience more buoyant force?

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Activity 10 1

1. The minimum amount of energy required the most loosely bounded electron is called

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2. When does the value of energy become zero for an electron?

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Activity 10 4

1. Take an empty plastic bottle . Close the mouth of the bottle with an airtight stopper . Put it in a bucket filled with watere . The bottle floats .

Push the bottle into the water. You feel an upward push. Try to push it further down. You will find it difficult to push deeper and deeper. Water exerts a force on the bottle in upward direction. Now release the bottle. It bounces back to the surface.

Does the force due to the gravitational attraction of the earth act on this bottle? If so,

why doesn't the bottle stay immersed in water after it is released ?

2. Take an empty plastic bottle . Close the mouth of the bottle with an airtight stopper . Put it in a bucket filled with watere . The bottle floats .

Push the bottle into the water. You feel an upward push. Try to push it further down. You will find it difficult to push deeper and deeper.

Water exerts a force on the bottle in upward direction. Now release the bottle. It bounces back to the surface.

How can you immerse the bottle in water ?

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