PHYSICS

BOOKS - NCERT PHYSICS (ENGLISH)

GRAVITATION

Multiple Choice Questions

1. 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 of some magnitude

D. Undergo a change in their inertia

Answer: A

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2. The value of acceleration due to gravity

A. Is same on equator and poles

B. Is least on poles

C. Is least on equator

D. Increases from pole to equator

Answer: C

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3. The gravitational force between two object is F. It masses of both object are halved without changing distance between them, then the gravitation force would become

A. F/4

B. F/2

C. F

D. 2F

Answer: A

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4. A boy is whirling a stone tied with a string in a horizontal circular path. When the string breaks, the stone

A. Will continue to move in the circular path

B. Will move along a straight line towards the center of the circular path

C. Will move along a straight line tangential to the circular path

D. Will move along a straight line perpendicular to circular path aways from the boy

Answer: C

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

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

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6. 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 greatest at the surface of the earth

D. is universal constant of nature

Answer: D

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7. Law of gravitation gives the gravitational force between

A. the earth and a point mass only

B. the earth and the sun only

C. any two bodies having some mass

D. two charged bodies only

Answer: C

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8. The value of quantity of G in the law of gravitation

A. depends on mass of the earth only

B. Depends on radius of earth only

C. depends on both mass and radius of the earth

D. is independent of mass and radius of the earth

Answer: D

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9. 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. $\frac{1}{4}$ times

B. 4 times

C. $\frac{1}{2}$ times

D. unchanged

Answer: B

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10. The atmosphere is held to the earth by

A. gravity

B. wind

C. clouds

D. earth's magnetic field

Answer: A

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11. The force of attraction between two unit point masses separted by a unit distance is called

A. gravitational potential

B. acceleration due to gravity

C. gravitational field

D. universal gravitational constant

Answer: D

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12. The weight of an object at the centre of the earth of radius R is

A. zero

B. infinite

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

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

Answer: A

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

A. 2N

B. 8N

C. 10N

D. 12N

Answer: A

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14. A brick stands on a box having 60 cm length, 40 cm breadth and 20 cm width. Pressure exerted by the brick will be:

A. Maximum when length and breadth form the base

B. Maximum when breadth and width form the base

C. Maximum when width and length form the base

D. The same in all the above three cases

Answer: B

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15. 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 equal

Answer: D

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Short Answer Type Questions

1. What is the source of centripetal force that a planet requires to revolve around the sun ? On what factors does that force depend?

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2. On the earth, a stone is thrown from a height in a direction parallel to the earth's surfaces while another stone is simultaneously dropped from the same height. Which stone whould reach the ground first and why ?

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3. Suppose gravity of earth suddenly become zero, then in which direction will the moon

begin to move if no other celestial body affects it?

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4. Identical packets are dropped from two areoplanes, one above the equator and the other above the north poole, both at height h. Assuming all condition are identical, will those packets take same time to reach the surface of earth. Justify your answer.

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5. The weight of any person on the moon is about $1/6$ times that on the earth. He can lift a mass of 15 kg on the earth. What will be the maximum mass, which can be lifted by the same force applied by the person on the moon?

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6. Calculate the average density of earth in terms of g, G and R.

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7. The Earth is acted upon by the gravitational force of attraction due to the sun. They why does the Earth not fall towards sun?

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Long Answer Type Questions

1. How does the weight of an object vary with respect to mass and radius of the earth. In a hypothetical case, if the diameter of the earth becomes half of its present value and its ,mass becomes four times of its present value, then how would the weight of any object on the surface of the earth be affected?

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2. How does the force of attraction between the two bodies depend upon their masses and distance between them ? A student thought that two bricks tied together would fall faster than a single one under the action of gravity. Do you agree with his hypothesis or not ? comment.

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3. Two objects of massses m_1 and m_2 having the same size are dropped simultaneously from hights h_1 and h_2 respectively. Find out the ratio of time they would take in reaching the ground. Will this ratio remain the same if (i)one of the objects is hollow and the other one is solid and (ii)both of them are hollow, size remaining the same in each case. give reason.

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4. (a). A cube of side 5 cm is immersed in water and then in saturated salt solution. In which case will it experience a greater buoyant force. If each side of the cube is reduced to 4 cm and then immersed in water, what will be the effect on the buoyant force experienced by the cube as compared to the first case for water. Given reason for each case.

(b). A ball weghing 4 kg of density 4000 kg/m^3 is completely immersed in water of density $10^3 kg/m^3$ find the force of buoyancy on it. (given $g = 10m/s^2$)

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