PHYSICS

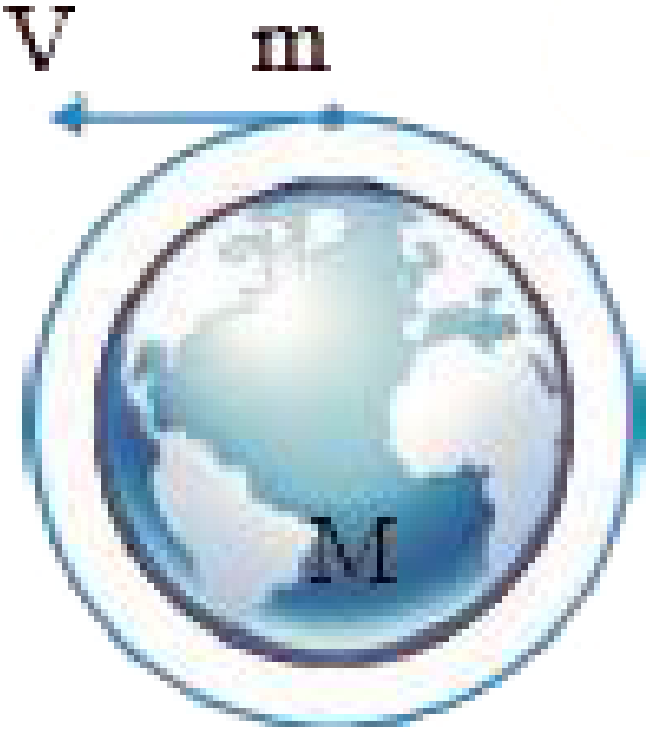
NCERT - NCERT PHYSICS(BENGALI ENGLISH)

GRAVITATION

Example

1. What is the time period of satellite near the earth's surface? (neglect height of the orbit of

satellite from the surface of the earth)?



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2. A body is projected vertically up. What is the distance covered in its last second of upward motion? $\left(g = 10m/s^2\right)$

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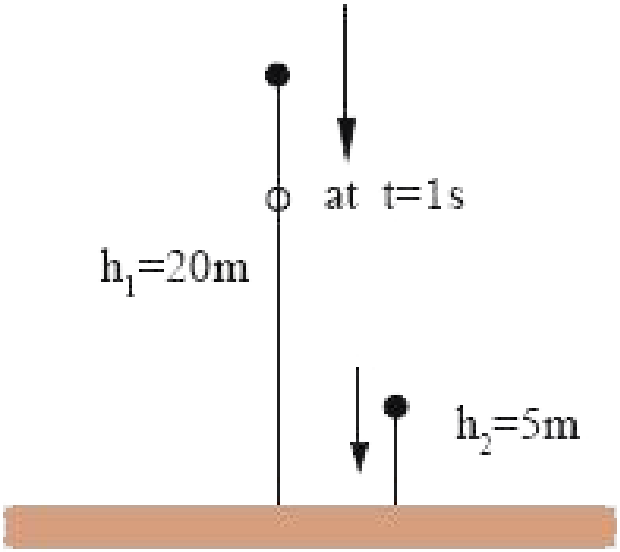
3. Two bodies fall freely from different heights and reach the ground simultaneously. The time of descent for the first body is $t_1 = 2s$ and for the second $t_2 = 1s$. At what height was the first body situated when the other

began to fall? $\left(g = 10m/s^2\right)$



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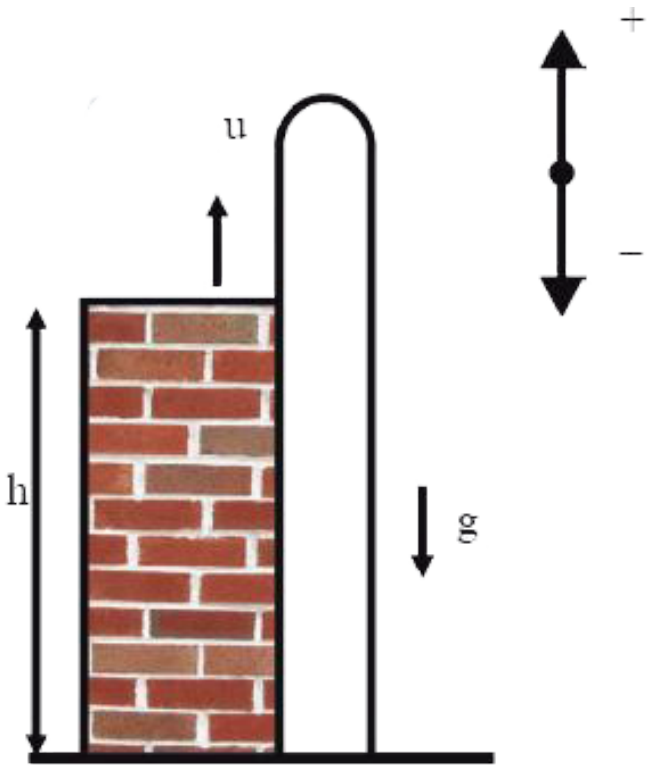
4. A stone is thrown vertically up from the tower of height 25m with a speed of 20 m/s

What time does it take to reach the ground ?

$(g = 10m/s^2)$



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5. Find the time taken, by the body projected vertically up with a speed of u, to return back to the ground.

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Think And Discuss

1. Can an object move along a curved path if no force acts on it?

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2. As a car speeds up when rounding a curve, does its centripetal acceleration increase? Use an equation to defend your answer.

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3. Calculate the tension in a string that whirls a 2 kg - toy in a horizontal circle of radius 2.5 m when it moves at 3m/s.

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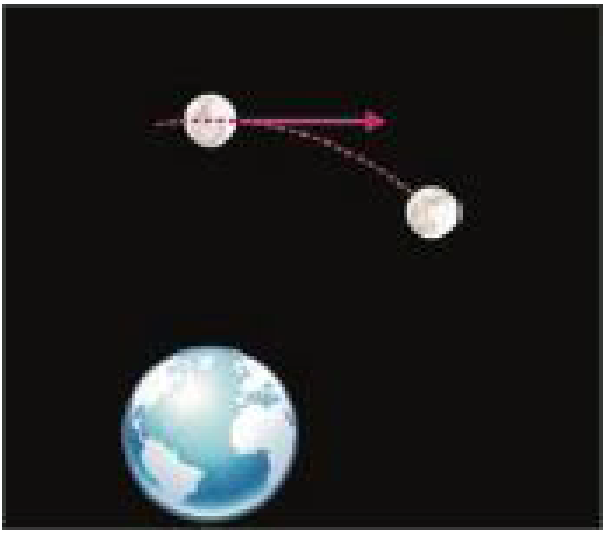
4. In figure 7, we see that the moon 'falls' around earth rather than straight into it. If the magnitude of velocity were zero, how would it move?



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5. According to the equation for gravitational force, what happens to the force between two bodies if the mass of one of the bodies doubled ?

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6. If there is an attractive force between all objects, why do we not feel ourselves gravitating toward massive buildings in our vicinity ?

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7. Is the force of gravity stronger on a piece of iron than on a piece of wood if both have the same mass?

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8. An apple falls because of the gravitational attraction of earth.

What is the gravitational attraction of apple on the earth?

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9. Give an example for the motion of an object of zero speed and with non zero acceleration?

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10. Two stones are thrown into air with speeds 20 m/s, 40m/s respectively? What are accelerations possessed by the objects?

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11. When is your weight equal to mg?

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12. Give example of when your weight is zero?

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13. Where does the centre of gravity of a sphere and triangular lamina lie?

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14. Can an object have more than one centre of gravity?

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15. Why doesn't the leaning tower of Pisa topple over?

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Let Us Improve Our Learning Reflections On Concepts

1. How do you explain that an object is in uniform circular motion (AS_1)

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2. Calculate the acceleration of the moon towards earth's center (AS_1)

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3. Explain universal law of gravitation. (AS_1)

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4. Where does the center of gravity of the atmosphere of the earth lie? (AS_2)

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Let Us Improve Our Learning Application Of Concepts

1. A car moves with constant speed of 10 m/s in a circular path of radius 10m. The mass of the car is 1000 kg. How much is the required centripetal force for the car?

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2. What is the speed of an apple dropped from a tree after 1.5 second? What distance will it cover during this time? Take $g = 10m/s^2$ (AS_1)

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3. A ball is projected vertically up with a speed of 50 m/s. Find the maximum height , the time to reach the maximum height, and the speed at the maximum height $\left(g = 10m/s^2\right)(AS_1)$

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4. Two spherical balls of mass 10 kg each are placed with their centers 10 cm apart. Find the

gravitational force of attraction between them. (AS_1)

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5. Find the free-fall acceleration of an object on the surface of the moon, if the radius of the moon and its mass are 1740 km and 7.4×10^{22} kg respectively. Compare this value with free fall acceleration of a body on the surface of the earth. (AS_1)

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6. A ball is dropped from a height. If it takes 0.2s to cross the last 6m before hitting the ground, find the height from which it is dropped. Take $g = 10m/s^2(AS_1)$

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7. The bob of a simple pendulum of length 1 m has mass 100g and a speed of 1.4 m/ s at the lowest point in its path. Find the tension in

the string at this moment. Take $g = 9.8m/\sec^2(AS_1)$

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8. What path will the moon take when the gravitational interaction between the moon and earth disappears? (AS_2)

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9. Can you think of two particles which do not exert gravitational force on each other? why? (AS_2)

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Let Us Improve Our Learning Multiple Choice Questions

1. The acceleration which can change only the direction of velocity of a body is called

A. Acceleration due to gravity

B. Uniform acceleration

C. Centripetal acceleration

D. Centrifugal acceleration

Answer:

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2. The distance between the Earth and the Moon is

A. 3,84,400 Km

B. 3,84,400 cm

C. 84,000 Km

D. 86,000 Km

Answer:

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3. The value of Universal Gravitaitonal Constant is

A. $6.67 \times 10^{-11} N.\, m^2 Kg^{-2}$

B. $9.8 m / \sec^2$

C. $6.67 \times 10^{-12} N.\, m^2 Kg^{-2}$

D. $981 m / \sec^2$

Answer:

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4. The weight of an object whose mass is 1 Kg is

A. $1Kg/m^2$

B. $9.8m/\sec^2$

C. $9.8N$

D. $9.8N/m^2$

Answer:

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5. The state of a freely falling body is

A. Heavy weight

B. Less weight

C. Weight less

D. Constant weight

Answer:

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