



PHYSICS

NCERT - NCERT PHYSICS(GUJRATI ENGLISH)

WORK AND ENERGY

Example

1. A boy pushes a book kept on a table by applying a force of 4.5 N. Find the work

done by the force if the book is displaced through 30 cm along the direction of push.



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2. Calculate the work done by a student in lifting a 0.5 kg book from the ground and keeping it on a shelf of 1.5 m height.

$$(g = 9.8m / s^2)$$



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3. A box is pushed through a distance of 4m across a floor offering 100N resistance. How much work is done by the resisting force ?



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4. A ball of mass 0.5 kg thrown upwards reaches a maximum height of 5m. Calculate the work done by the force of gravity during this vertical displacement considering the value of $g = 10m / s^2$.





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5. Find the kinetic energy of a ball of 250 g mass, moving at a velocity of 40 cm/s.



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6. The mass of a cyclist together with the bicycle is 90 kg. Calculate the work done by cyclist if the speed increases from 6km/h to 12 km/h.



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7. A block of 2 kg is lifted up through 2m from the ground. Calculate the potential energy of the block at that point.



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8. A book of mass 1 kg is raised through a height 'h'. If the potential energy increased by 49 J, find the height raised.



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9. A person performs 420 J of work in 5 minutes. Calculate the power delivered by him.



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10. A woman does 250 J of work in 10 seconds and a boy does 100 J of work in 4 seconds. Who delivers more power ?



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Let Us Improve Our Learning Reflections On Concepts

1. What is work according to science and write its units. (AS_1)



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2. Give few examples where displacement of an object is in the direction opposite to the force acting on the object. (AS_1)



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3. Write few daily life examples in which you observe conservation of energy. (AS_6)



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4. Draw a diagram to show conservation of mechanical energy is case of a free falling body. (AS_5)



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5. Give some examples for renewable sources of energy (AS_1)



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Let Us Improve Our Learning Application Of Concepts

1. A man carrying a bag of total mass 25 kg climbs up to a height of 10 m in 50 seconds. Calculate the power delivered by him on the bag. (AS_1)



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2. A 10 kg ball is dropped from a height of 10m. Find (a) the initial potential energy of the ball. (b) the kinetic energy just before it reaches the ground, and (c) the speed just before it reaches the ground. (AS_1)



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3. Calculate the work done by a person in lifting a load of 20 kg from the ground and placing it 1 m high on a table (AS_1)



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4. Find the mass of a body which has 5J of kinetic energy while moving at a speed of 2m/s (AS_1)



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5. A cycle together with its rider weighs 100 kg.

How much work is needed to set it moving at 3

m/s (AS_1)



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6. Which of the renewable sources of energy

would you think suitable to produced in you

native place. Why ? (AS_7)



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Let Us Improve Our Learning Higher Order Thinking Questions

1. What is potential energy ? Derive an equation for gravitational potential energy of a body of mass 'm' at a height 'h'. (AS_1)



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2. What is kinetic energy ? Derive an expression for the kinetic energy of a body of mass 'm' moving at a speed 'v'. (AS_1)



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3. When you lift a box from the floor and put it on an almirah the potential energy of the box increases but there is no change in its kinetic energy. Is it violation of conservation of energy? Explain. (AS_7)



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4. When an apple falls from a tree what happens to its gravitational potential energy just as it reaches the ground ? After it strikes the ground ? (AS_7)



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Multiple Choice Questions

1. S.I. unit of work

A. N-m

B. kg-m

C. N/m

D. $N - m^2$

Answer:



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2. The energy possessed by a body by virtue of its motion is called as

A. potential energy

B. kinetic energy

C. Attractive energy

D. Gravitational energy

Answer:



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3. Two objects with same masses have been dropped from same height at same time.

Which of the following will remain same in case of these objects

A. Speed

B. Gravitational force

C. Potential energy

D. Kinetic energy

Answer:



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4. A person is climbing a ladder with a suitcase on his head. Then the work done by that person on that suitcase is

A. Positive

B. Negative

C. Zero

D. Can not be defined

Answer:



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5. IF you have lifted a suitcase and kept it on a table, then the work done by you will depend on

- A. The path of the motion of the suitcase
- B. The time taken by you to do the work
- C. Weight of the suitcase
- D. Your weight.

Answer:



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Think And Discuss

1. A wooden chair is dragged on the level floor and brought to the same place. Let the distance covered be 's' and frictional force acted on the chair by the floor be 'f' . What is the work done by the frictional force



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2. Lift an object up. Work is done by the force exerted by you on the object. The object moves upwards. The force you exerted is in the

direction of displacement. However, there is the force of gravity acting on the object.

Which one of these forces is doing positive work? Give reason.



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3. What would happen if nature does not allow the transfer of energy? Discuss with few examples.



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4. Why is it easier to stop a lightly loaded truck than heavier one that has equal speed



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5. Does the Kinetic energy of a car change more when it goes from 10 m/s to 20 m/s or when it goes from 20 m/s to 30 m/s.?



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6. A person starts from rest and begins to run. The runner puts a certain momentum into himself. What is the momentum of ground? And the runner puts a certain amount of kinetic energy into himself. What is the kinetic energy of the ground.?



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7. Does the international space station have gravitational potential energy





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8. Someone wants to sell you a super ball claims that it will bounce to a height greater than the height from which it is dropped. Would you buy this ball ? If yes explain, if not explain



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9. A ball, initially at the top of the inclined hill, is allowed to roll down. At the bottom its

speed is 4 m/s. Next the ball is again rolled down the hill, but this time it does not start from rest. It has an initial speed of 3 m/s. How fast is it going when it gets to the bottom ?



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10. The work done by a force F_1 is larger than the work done by another force F_2 . Is it necessary that power delivered by F_1 is also larger than that of F_2 ? Why



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11. Is the firewood obtained by cutting of trees renewable or non renewable source of energy?

Why?



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