PHYSICS

BOOKS - ICSE

ENERGY

Numerical Problem

1. Calculate the amount of work done, when a force of 25 N displaces a body through 10 m, in its own direction.

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Numerical Problem On Gravitational Potential Energy

1. A stone of weight 10 kg is lying on the top of a house 4m high. What is the amount of stored energy in the stone ? [Take 1 kgf=10N]

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2. A girl of mass 40 kg climbs up stairs by spending 800 J of energy. How high does the girl climb up ? [Take g=10 ms^{-2}]

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Numerical Problem On Kinetic Energy

1. A bicycle rider along with his bicycle has a mass of 80 kg. if he is peddling at constant

speed $8ms^{-1}$, what is the amount of energy possessed by this system ?

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2. A machine gun bullet of mass m leaves the barel at a speed of 100 ms^{-1} and has a kinetic energy of 1000 J. what is the mass of bullet ?

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Exercise 4 1 Objective Type Questions Fill In The Blank A

1. Fill in the blank spaces by choosing the correct words from the list given below:

direction, joule, work, energy, force

Q. Ability to do work is called _____.

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2. Fill in the blank spaces by choosing the correct words from the list given below:

direction, joule, work, energy, force

Q. When a force causes displacement in its own ____, work is said to be done.

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3. Fill in the blank spaces by choosing the correct words from the list given below:

direction, joule, work, energy, force

Q. An elephant uprooting a small tree does _____.

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4. Fill in the blank spaces by choosing the correct words from the list given below:

direction, joule, work, energy, force

Q. The work done by a body is the product of ____and displacement.

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5. Fill in the blank spaces by choosing the correct words from the list given below:

direction, joule, work, energy, force

Q. _____is the SI unit of work.

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Exercise 4 1 Objective Type Questions True Or False B

1. SI unit of work or energy is joule. _____

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2. The product of force and the displacement caused by it is called pressure._____

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3. A student preparing his lessons for montly test does hard work.____.

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4. A boy carrying a school bag on his shoulder does no work . (Why)

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5. The more the force is applied on a body to cause displacement, the more is the work done.

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Exercise 4 1 Objective Type Questions C

1. Statement given below is incorrect. Write the correct statement.

Work is done when we hold a pile of books on our hands.

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2. Statement given below is incorrect. Write the correct statement.

Q. Work done by a body is the product of pressure and displacement.

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3. Statements given below are incorrect. Write the correct statements.

Q. Work is done when a force causes displacement at right angles to its own direction.

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4. Statements given below are incorrect. Write the correct statements.

Q. A headmaster giving a speech in a school assembly does work.

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5. Statements given below are incorrect. Write the correct statements.

Q. The SI unit of work or energy is pascal (pa).

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Exercise 4 1 Objective Type Questions Tick The Most Appropriate Answer D

1. The capacity to do work is called :

A. acceleration

B. speed

C. energy

D. pressure

Answer:

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2. The work done by a body is the product of force and

A. distance

B. speed

C. displacement

D. velocity

Answer:

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3. The SI unit of work is

A. newton

B. pascal

C. joule

D. newton-metre

Answer:

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4. 30 joules work is done, when a force 'F' causes a displacement of 5 m. the magnitude of force is :

A. 6 pascal

B. 6 newton

C. 6 newton-metre

D. none of these

Answer:

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5. When is the work done in the following situation:

(i) A boy pushing a wall

(ii) A girl carrying a school bag on her

shoulders

(iii) A stone falling freely

(iv) A boy climbing up the stairs.

A. (i) and (ii)

B. (i) and (iii)

C. (ii) and (iv)

D. (iii) and (iv)

Answer:

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Exercise 4 1 Objective Type Questions Match The Column E

1. Match the following

Column A	Column B
1. The term used when a force causes displacement in a body in its own direction.	(a) No work done
2. The ability to do work.	(b) Joule
3. SI unit of work or energy.	(c) Energy
4. Displacement caused by a force at right angles to its own direction.	(d) Work

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Exercise 4 1 Study Questions

1. (a) What is energy ?

(b) What do you understand by the term work ?

(c) Is the energy spent in thinking or talking kind of work ? Give reason for your answer.

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2. (a) When does a force do work ?

(b) State two examples when a force acting on a body does not do any work.

(c) State the mathematical expression of work.

(d) Name the SI unit of work.

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3. The SI unit of work or energy is joule. Explain why the work and energy have same SI unit.

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4. A force of 25 N causes a displacement of 4 m in its own direction. What is the magnitude

of work done ?

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5. A boy does a work of 800 J is dragging a sach of rice through a distance of 10 m. what is the magnitude of force applied by the boy?

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6. A girl applies a force of 50 N, in pushing a table such that work done by her is 25 J.

calculate the displacement produced in the table.

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Exercise 4 2 Objective Type Questions A

1. Fill I the blank spaces by choosing the correct words from the list given below:

kinetic, weight, configuration, potential, increasing.

Q. The energy posessed by a body by virtue of its motion is called _____ energy.

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2. Fill I the blank spaces by choosing the correct words from the list given below:

kinetic, weight, configuration, potential, increasing.

Q. The energy posessed by a body by virtue of its motion is called _____ energy.

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3. Fill I the blank spaces by choosing the correct words from the list given below:

kinetic, height , configuration, potential, increasing.

Q. The potential energy possessed by a body is directly proportional to the _____ of body.

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4. Fill I the blank spaces by choosing the correct words from the list given below:

kinetic, weight, configuration, potential, increasing.

Q. The kinetic energy possessed by a body increases by ____its speed.

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5. Fill I the blank spaces by choosing the correct words from the list given below:

kinetic, weight, configuration, potential, increasing.

Q. A flying bird has kinetic energy as well as _____energy.

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Exercise 4 2 Objective Type Questions True False B

1. A stretched bow and arrow system has kinetic energy._____

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2. Kinetic energy of a body is directly proportional to the square of its speed. ____

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3. A flying aeroplane has only kinetic energy. _____

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4. The energy possessed by water in hydroelectric dams is potential energy. _____

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5. The various forms of energy are inter convertible._____

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Exercise 4 2 Objective Type Questions C

1. Statements given below are incorrect. Write the correct statements.

Q. A compresed spring of a toy gun possesses kinetic energy.

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2. Statements given below are incorrect. Write the correct statements.

Q. A flying bird possessed only kinetic energy.

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3. Statements given below are incorrect. Write the correct statements.

Q. A stone is projected in the vertically upward direction. Then its potential energy changes to kinetic energy.

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4. Statements given below are incorrect. Write the correct statements.

Q. The product of mass and vertical

displacement of a body is an expression for its potential energy.

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5. Statements given below are incorrect. Write the correct statements.

Q. When a moving pendulum stops, its energy is destroyed.

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Exercise 4 2 Objective Type Questions Tick The Most Appropriate Answer D

1. The water stored in a tank on the top of a roof has:

A. kinetic energy

B. potential energy

C. both kinetic and potential energy

D. hydel energy

Answer:

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2. A strong current of water turns the blades of a water turbine, because it possesses:

A. potential energy

B. kinetic energy

C. both potential and kinetic energy

D. none of these

Answer:

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3. Which one is odd amongst following in terms of kinds of energy ?

A. Shooting star

B. A blowing wind

C. Flowing water

D. Stone on the top of a hill

Answer:

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4. Which one is odd amongst the following in terms of kinds of energy ?

A. Water stored on roof in a tank

B. A compressed spring of a toy gun

C. A stretched bow and arrow system

D. A speeding car

Answer:

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Exercise 4 2 Objective Type Questions Match The Column E

1. Match the following

Column A	Column B
1. Expression for potential energy.	(a) $\frac{1}{2}mv^2$
2. Energy possessed by a compressed spring.	(b) Kinetic energy
3. Energy possessed by fast moving water.	(c) Law of conservation of energy
4. Expression for kinetic energy.	(d) mgh
5. Energy cannot be created or not be destroyed, but can change its form.	(e) Potential energy

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Exercise 4 2 Study Questions

1. (a) What do you understand by the term potential energy ?

(b) State two factors which determine potential energy of a body.

(c) Give four examples of potential energy.

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2. (a) What do you understand by the term kinetic energy ?

(b) State two factors which determine kinetic

energy of a body.

(c) Give four examples of kinetic energy.

(d) Two bodies have equal mass. However, the speed of the one body is twice the speed of other body. what is the ratio of kinetic energy of the two bodies ?

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3. By giving an example, state and explain the law of conservation of energy.

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4. A stone of weight of 2 kgf is lying on the roof of a building 60 m high. Calculate the amount of stored energy in the stone. [Take 1 kgf=10N]

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5. A stone of mass 0.10 kg is projected vertically upward by expending 80 J of energy. How high the stone rises ? [Take g=10ms^{-2}]

[80 m]

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6. State the kind of energy (potential or kinetic or both) in case of following :

(a) Stone resting on the top of a hill.

(b) An arrow shooting from a stretched bow and arrow system.

(c) A flying mosquito

(d) A wound-up spring of a toy car

(e) A speeding car

(f) A bullet fired from a gun.

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7. 40 kg of water flows out of a tap at uniform speed of 5 ms^{-1}. Calculate the amount of energy possessed by the water.

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8. A train of mass 100 tonnes is moving with a uniform speed of 2 ms^{-1}. Calculate the amount of energy possessed by the train.

[Take 1 tonne=1000 kg] [200,000 J]

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9. A car expends an energy of 25,000 J while moving at a constant speed of 5 ms^{-1}. What is the mass of car ?

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10. A vehicle expends an energy of 4000 J while moving at a constant speed of 10 ms^{-1}. What is the mass of vehicle ?

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Exercise 4 3 Objective Type Questions A

1. Fill in the blank spaces by choosing the correct words from the list given below:

chemical, solar, heat, electric, kinetic.

Q. In hydroelectric dams the ____ energy of flowing water is transformed into electric energy.

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2. Fill in the blank spaces by choosing the correct words from the list given below:

chemical, solar, heat, electric, kinetic.

Q. Nuclear energy is released in the form of _____enegy when an atom splits.

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3. Fill in the blank spaces by choosing the correct words from the list given below:

chemical, solar, heat, electric, kinetic.

Q. During photosynthesis, the ____energy changes into chemical energy.

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4. Fill in the blank spaces by choosing the correct words from the list given below:

chemical, solar, heat, electric, kinetic.

Q. During digestion of food the ____energy of food changes into heat energy.

Watch Video Solution

5. Fill in the blank spaces by choosing the correct words from the list given below:

chemical, solar, heat, electric, kinetic.

Q. A loudspeaker converts ___energy into sound energy.

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Exercise 4 3 Objective Type Questions True Or False B

1. Magnetic energy always causes attraction. (T/F)

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2. The energy in an electric cell is stored in the form of chemical energy. ____

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3. An electric bulb converts electric energy into heat energy only._____

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4. The source of energy in a nuclear bomb is its chemical energy._____

Watch Video Solution

5. In electric wind stations, the potential energy of wind changes into electric energy. _____

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Exercise 4 3 Objective Type Questions C

1. Statement given below is incorrect. Write the correct statement.

Q. During the charging of a car battery, the chemical energy changes into electric energy.

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2. Statements given below are incorrect. Write the correct statements.

Q. During photosynthesis by plants the heat energy changes to chemical energy.

Watch Video Solution

3. Statements given below are incorrect. Write the correct statements.

Q. When we speak in front of a microphone, the electric energy changes into sound energy.

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4. Statements given below are incorrect. Write the correct statements.

Q. When an electric current flows through an

electric bulb, the electric energy first changes to light energy and then to heat energy.

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5. Statements given below are incorrect. Write the correct statements.

Q. The energy released during disintegration of nucleus of an atom is in the form of light energy.

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Exercise 4 3 Objective Type Questions Tick The Most Appropriate Answer D

1. Burning of paper in an example of conversion of :

A. heat energy into light energy

B. chemical energy into heat energy

C. chemical energy into light energy

D. both (b) and (c)

Answer:

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2. The ultimate source of energy on the planet earth is:

A. sun

B. coal

C. petroleum products

D. molten lava within the earth

Answer:

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3. The cause of water cycle in nature is :

A. chemical energy

B. nuclear energy

C. solar energy

D. kinetic energy of wind

Answer:

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4. Strong wind turns the blades of wind turbine because it possesses :

A. potential energy

B. kinetic energy

C. both (a) and (b)

D. none of these

Answer:

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5. When a person speaks in front of a micro-phone, the sound energy changes into ,

A. loud sound energy

B. magnetic energy

C. chemical energy

D. electric energy

Answer:

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Exercise 4 3 Objective Type Questions Match The Column E

1. Match the following

Column A	Column B
1. A device which converts electric energy into heat energy only.	(a) Microphone
2. A device which converts electric energy into mechanical energy.	(b) Electric generator
3. A device which converts sound energy into electric energy.	(c) Electric motor
4. A device which converts light energy into electric energy.	(d) Electric geyser
5. A device which converts mechanical energy into electric energy.	(e) Photo-voltaic cell

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Exercise 4 3 Objective Type Questions Study Questions

1. (a) What is mechanical energy ?

(b) What kind of energy changes take place in the bodies of living beings, so as to produce mechanical energy.

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2. (a) Give a simple example to prove that heat is a form of mechanical energy.

(b) Name three devices/industries in which heat energy is put to some useful work.

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3. (a) Give a simple example in nature to prove that light is a form of energy.

(b) Give examples to prove (i) light energy changes into chemical energy. (ii) light energy changes into electric energy.

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4. (a) Give a simple example to prove that sound is kind of energy.

(b) Name a device which converts sound dnergy into (a) electric energy (b) magnetic energy.

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5. (a) Why is electric energy considered most desirable forms of energy ?

(b) Name two devices which convert electric energy into :

(i) heat energy only

(ii) heat and light energy.

(iii) mechanical energy

(iv) magnetic energy.

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6. Explain what is chemical energy. To what uses is this energy put ?

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7. Briefly, describe nuclear energy and its (a) one use (b) one misuse.

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8. Give three examples of inter-conversion of chemical energy into other forms of energy.

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9. By giving examples, explain how Sun is the ultimate source of energy on planet Earth.

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Theme Assignment Objective Type Questions A

1. Fill in Blanks:

In human body, the chemical energy of food first changes into _____energy. (mechanical/heat).

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2. Fill in Blanks:

The energy released during nuclear

disintegration is in the form of _____energy only. (heat/sound).

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3. Fill in Blanks:

_____is the S.I. unit of work. (newton/joule).

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4. Fill in Blanks:

No work is done when ____takes places at right

angles to the direction of applied force. (displacement/acceleration).

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5. Fill in Blanks:

When a force of 2N causes a displacement of 0.5 m the work done is _____(1 pascal/1 joule)

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Theme Assignment Objective Type Questions Tick The Most Appropriate Answer B

1. Water stored in the tank on the top of a roof has:

A. potential energy

B. kinetic energy

C. both (a) and (b)

D. solar energy

Answer:

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2. The work done by a body is the product of force and

A. distance

B. speed

C. displacement

D. velocity

Answer:

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3. The rate of doing work is called

A. force

B. energy

C. power

D. none of these

Answer:

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4. SI unit of energy

A. joule

B. newton

C. pascal

D. none of these

Answer:

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5. The energy possessed by a body due to its motion is called ..... energy

A. potential energy

B. kinetic energy

C. heat energy

D. none of these

Answer:

6. In steam or diesel engines the heat energy is converted into

A. electric energy

B. mechanical energy

C. light energy

D. none of these

Answer:

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7. Burning of wood is an example of conversion of

A. chemical energy into heat energy only

B. chemical energy into light energy only

C. chemical energy into heat and light energies.

D. heat energy into light energy.

Answer:

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Theme Assignment Objective Type Questions C

1. A compressed spring of an air gun has kinetic energy.

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2. An electric bulb converts electric energy into heat energy only._____

Watch Video Solution

3. The potential energy possessed by a body at a height above the ground is called elastic

potential energy.

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Theme Assignment

1. (a) Describe potential energy and kinetic energy with proper examples.

(b) State difference between energy and power.

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2. Explain the energy changes taking place in the following situations:

(a) Switching on a flash light.

(b) Using coal to generate electricity.

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3. A stone of mass 0.4 kg is projected vertically upward through a height 10 m. if g=10 ms^{-2}, calculate the potential energy of the stone at the highest point.

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4. Explain how sun is the ultimate source of energy by taking any one example

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