NCERT ANNEXURE

Below you can go through the subjective type questions and solutions from NCERT Annexure.

1. **Define energy. Write SI unit of energy. What are the different forms of energy?**

Ans. The ability to do work is called energy.
The SI unit of energy is joule (J).
Different forms of energy are as follows.
(A) Mechanical energy   (B) Thermal or Heat energy
(C) Light energy   (D) Sound energy
(E) Chemical energy   (F) Electrical energy
(G) Solar energy   (H) Nuclear energy.

2. **A man drops a stone of 200g from a height of 5m. What is its kinetic energy when it reaches the ground? What is its speed before it hits the ground?**

Ans.: $u = 0$ m/s
$h = 5$m
$v = ?$
Using the equation of motion,
$v^2 = u^2 + 2as$
$v^2 = u^2 + 2gh$
$v^2 = 0 + 2 \times 9.8 \times 5 = 98$
This is the speed with which body hits the ground.
Kinetic energy of the body before hitting the ground is,
$m = 200g = 0.2$kg
$KE = \frac{1}{2} mv^2 = \frac{1}{2} \times 0.2 \times 98 \times 98 = 960.4$ J

3. **Look at the activities listed below. Reason out whether work is done or not in the light of your understanding of the term 'work'.**
(a) Suma is swimming in a pond.
(b) A donkey is carrying a load on its back.
(c) A wind-mill is lifting water from a well.
(d) A green plant is carrying out photosynthesis.
(e) An engine is pulling a train.
(f) Food grains are getting dried in the sun.
(g) A sailboat is moving due to wind energy.

Ans. (a) While swimming, Suma applies a force to push the water backwards. Therefore, Suma swims in the forward direction caused by the forward reaction of water. Here, the force causes a displacement. Hence, work is done by Suma while swimming.

(b) While carrying a load, the donkey has to apply a force in the upward direction. But, displacement of the load is in the forward direction. Since, displacement is perpendicular to force therefore, the work done is zero.

(c) A wind mill works against the gravitational force to lift water. Hence, work is done by the wind mill in lifting water from the well.

(d) In this case, there is no displacement of the leaves of the plant. Therefore, the work done is zero.

(e) An engine applies force to pull the train. This allows the train to move in the direction of force. Therefore, there is a displacement in the train in the same direction. Hence, work is done by the engine on the train.

(f) Food grains do not move in the presence of solar energy. Hence, the work done is zero during the process of food grains getting dried in the Sun.

(g) Wind energy applies a force on the sailboat to push it in the forward direction. Therefore, there is a displacement of the boat in the direction of force. Hence, work is done by wind on the boat.

4. **A mass of 10 kg is at a point A on a table. It is moved to a point B. If the line joining A and B is horizontal, what is the work done on the object by the gravitational force? Explain your answer.**

Ans. Work done by gravity depends only on the vertical displacement of the body. It does not depend upon the path of the body. Therefore, work done by gravity is given by the expression,

$W = mgh$ Where, Vertical displacement, $h = 0$

$\therefore W = mg \times 0 = 0$ Hence, the work done by gravity on the body is zero.

5. **The potential energy of a freely falling object decreases progressively. Does this violate the law of conservation of energy? Why?**

Ans. No. The process does not violate the law of conservation of energy. This is because when the body falls from a height, then its potential energy changes into kinetic energy progressively. A decrease in the potential energy is equal to an increase in the kinetic energy of the body. During the process, the total mechanical energy of the body remains conserved. Therefore, the law of conservation of energy is not violated.

NCERT EXEMPLAR

Multiple Choice Questions

1. **When a body falls freely towards the earth, then its total energy**

(A) Increases   (B) Decreases

(C) Remains constant   (D) First Increases and then decreases

Ans. (C)

2. **A car is accelerated on a levelled road and attains a velocity 4 times of its initial velocity. In this process the potential energy of the car**

(A) Does not change

(B) Becomes twice to that of initial

(C) Becomes 4 times that of initial

(D) Becomes 16 times that of initial

Ans. (A)

3. **In case of negative work the angle between the force and displacement is**
    (A) 0°   (B) 45°   (C) 90L   (D) 180°

Ans.   (D)

4. **An iron sphere of mass 10 kg has the same diameter as an aluminium sphere of mass is 3.5 kg. Both spheres are dropped simultaneously from a tower. When they are 10 m above the ground, they have the same**
    (A) Acceleration   (B) Momenta   (C) Potential energy   (D) Kinetic energy

Ans.   (A)

5. **A girl is carrying a school bag of 3 kg mass on her back and moves 200m on a levelled road. The work done against the gravitational force will be ($g = 10ms^{-2}$)**
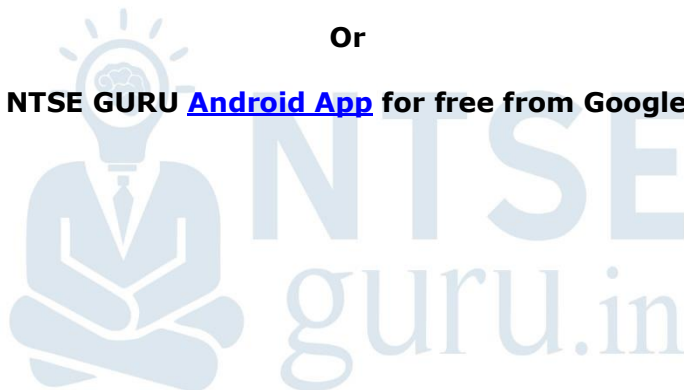   (A) 6×10^3 J   (B) 6 J   (C) 0.6 J   (D) Zero

Ans.   (D)