Exercise | Energy

A) Write T/F

A) A coolie does no work against the force of gravity while carrying a luggage on a plane road. [T]

b) The energy stored in water of a dam is kinetic energy. [F]

c) The energy of a flying kite is kinetic energy. [T]

d) Work done by a body depends on the time the force which the does work. [F]

e) Power spent by a body depends on the time for which it does work. [T]

B) Fill in the blanks

i) Work is said to be done by a force only when the __body moves__.

b. Work done = force × distance moved in direction of force.

c. The energy of a body is its capacity to do work.

d. The S.I Unit of energy is <u>Joule</u>.

e. The potential energy of a body is due to <u>state of rest are position</u> & kinetic energy energy of a body due to its <u>state of motion</u>.

f. Gravitional potential energy U = <u>mass force of gravity on unit mass × vertical height</u>.

g. Kinetic energy = $\frac{1}{2}$ × mass × (speed)²

h. Power P = <u>work done</u> / time taken

i. The S.I unit of power is <u>watt</u>.

j. $1 H.P$ = <u>746</u>

3. <u>Match the following</u>

<u>Column A</u>   <u>Column B</u>

a. A stone at a height   iv) Potential energy

b. A moving ball   v) Kinetic Energy

c. Energy   ii) Joule

d. Power   iii) Work done in 1.sec.

e. Watt   i) Power.

4) Select the correct alternative

a) The S.I Unit of work in __joule__

b) No work is done by a force if the body __does not move__.

c) Two coolies A & B do some work in time 1 minute & 2 minute respectively. The power spent is more by __coolie A than by B__

d) The expression of power P is
$$P = F \times \frac{d}{t}$$

e) 1 H.P is equal to __746 w__

f) when a boy doubles his speed, his kinetic energy becomes __four times__

g) A boy lifts a luggage from height 2m to 4m. the potential energy will become __double__.

B) Short / Long Answer Questions :-

1. Define work.

Ans - Work is said to be done if the force applied on a body, moves it. If no motion takes place, no work is said to be done. Work done is zero if the motion of body is normal to the force.

2. When does a force perform work?

Ans- Work is said to be done when the applied force makes the body move (i.e. there is a displacement of the body)

3. State two conditions when no work is done by a force.

Ans- Two conditions when no work is done by force are
(i) There is no displacement of the body i.e $S = 0$
(ii) The displacement is Normal to direction of force i.e $\theta = 90$ degree.

4) In which of the following cases is work being done.
a) A boy pushing a heavy rock
b) A boy climbing up the stairs.
c) A coolie standing with a box on his head.
d) A girl moving on the road.

Ans- b) A boy climbing up the stairs
d) A girl moving on the road.

5) A coolie is moving on a road with a luggage on his head. Does he perform work against the force of gravity? Give reasons for your answer.

Ans A coolie is moving on a road with a luggage on his head, the work done by him against the force of energy that is weight is zero. since distance moved by him is normal to his weight.

6) The moon is revolving around the earth in a circular path. How much work is done by the moon?

Ans. The work done by the moon during one circular motion is zero as the force acting between the earth & moon is gravitional force is conservative in nature & the work done by conservative forces doesnot depend on path followed. Also the force & displacement are perpendicular to each other. So the work done is zero.

7) Write the expression for work done by a force.

Ans - The work done by a force on a body is equal to the product of the force applied & the distance moved by the body in the direction of force i.e.

Work done = force × distance moved in the direction of force.

$$W = F \times d.$$

8) State the S.I units of works & define it.

Ans - The S.I unit of work is joule

One joule of work is said to be done if one newton force when acting on a body moves it by 1 metree in the direction of force

1 joule = 1 newton × 1 metre

or 1 J = 1N × 1m.

9. State two factors on which the work is done by a force on a body depends.

Ans - The work done by a force depends on the following two factors:
i - The magnitude of the force applied
ii - The distance moved by the body in the direction of force.

10) Define the term energy.

Ans - Energy is the capacity of doing work.

11) State S.I Unit of energy.

Ans - S.I Unit of energy is joule.

12. Define 1 joule of energy.

Ans - 1 joule is the amount of work done by a force of 1 Newton on an object that displace it through a distance of 1 meter in the direction of the applied force.

$$1 j = 1 N \times 1 m$$

13. How is work related to energy?

Ans - Relation between work & energy. Energy is the capacity of doing work. Every form of energy is work. i.e. work done on the body is stored in the form of

energy. Energy is spent when a body does work. Thus to do more amount of work more energy needed.

(14) what are the two kinds of mechanical energy?

Ans - The two kind of mechanical energy is i) Potential energy & ii) Kinetic energy.

15) what is potential energy? State its unit.

Ans- The energy possessed by a body due to its state of rest or restore position is called potential energy.

The s.I unit of potential energy is joule.