Class IX

ASSIGNMENT 5: **WIND, POWER AND ENERGY**

1. Read the activities listed below. Reason out whether or not work is done in the light of your understanding of 'work'.
   (a) Seema is swimming in the pond.
   (b) A donkey is carrying a load on his back.
   (c) A windmill is lifting water from a well
   (d) A green part is carrying out photosynthesis.
   (e) An engine is pulling a train.
   (f) Foodgrains are getting dried in the sun.
   (g) A sailboat is moving due to wind energy.
2. What will happen to the amount of work done if:
   (a) The magnitude of the force applied is increased?
   (b) The displacement of the body is reduced?
3. From the following activities listed below, state whether or not the work is done. Give reasons also.
   (a) An apple is falling off a tree.
   (b) A girl is pushing a book on a table.
   (c) A horse is pulling a cart.
   (d) Sunil is reading a book.
   (e) A man is pushing a wall
   (f) A man is holding a bucket of water.
   (g) A coolie is lifting a load on his head.
   (h) A cat is flying due to moving air.
   (i) A man is climbing the stairs.
   (j) A ball is thrown upwards in the air.
4. When is the work done by a force on a body said to be positive? Give 2 examples.
5. When is the work done by a force on a body said to be negative? Give 2 examples.
6. State with reason whether the work done in following is positive or negative:
   (a) Work done by a man in lifting out of the well a bucket tied by means of a rope.
   (b) Work done by gravitational force in the above case 'a'.
   (c) Work done by friction on a body sliding down an inclined plane.
   (d) Work done by applied force on a body moving on a rough horizontal plane with uniform velocity.
   (e) Work done by resistive force of air on a vibrating pendulum to bring it to rest.
7. Define one-joule energy.
8. Explain
   (a) A moving cricket ball can do work.
   (b) A striking hammer can do work.
   (c) A compressed spring can do work.
9. Explain with help of an activity
   (a) A moving object possesses energy and can do work.
   (b) An object moving faster can do more work than an identical object moving relatively slow.
10. Derive the formula for kinetic energy : $KE = 1/2mr^2$
11. How is the kinetic energy of a moving body affected if its velocity is tripled?
12. What would have a greater effect on kinetic energy of an object – doubling the mass or doubling the velocity?
13. A compressed spring can do work. Explain with the help of an activity.
14. A stretched spring can do work. Explain with help of an activity.
15. What happens to the potential energy of a body if
   (a) Its mass is tripled?
   (b) Its mass is reduced to one-fourth?
   (c) It is raised four times the original.
   (d) It is lowered halved to its original height?
   (e) The body is taken from the poles to the equator?
16. Give reasons:
   (a) Winding the spring of our watch, the hands of the watch move,
   (b) A bullet is released on firing the pistol.
   (c) An arrow moves forward when released from the stretched bow.
17. Explain the transformation in the following cases:
   (a) Production of hydroelectricity
   (b) Production of food by green plants
   (c) Running of a windmill
   (d) Production of fossil fuel
   (e) Water cycle in nature.
18. What kind of energy transformation takes place in the following gadgets?
   (A) Solar cell (b) telephone (c) electromagnet (d) electric heater
19. Name a device or gadget which converts
   (a) light energy to chemical energy
   (b) mechanical energy to heat energy
   (c) sound energy to mechanical energy
   (g) chemical energy to heat energy
   (h) heat energy to electrical energy
   (i) electrical energy to light energy

(d) heat energy to mechanical energy
(e) electrical energy to sound energy
(f) sound energy to electrical energy
(j) mechanical energy to sound energy
(k) nuclear energy to light energy
(l) heat energy to light energy

20. An object of mass 10 kg is dropped from a height of 20m; calculate the potential energy and kinetic energy of an object at various heights as mentioned in the data.

HEIGHT AT WHICH OBJECT IS LOCATED
20m
15m
10m
5m
JUST ABOVE THE GROUND

21. Define one kilowatt – hour
22. Derive the relationship between SI unit of electrical energy and commercial unit of energy
23. Two masses m & 2m are dropped from a height h & 2h. On reaching the ground, which will have more kinetic energy and why?