EXERCISE - 1

A Very Short Answer Type Questions

- Q.1 Is work a scalar or a vector quantity ?
- **Q.2** What name is given to the product of force and distance ?
- Q.3 Give the units of work in SI system and in CGS system.
- **Q.4** What is the work done, when the displacement of a body is perpendicular to the direction of force acting on it ?
- **Q.5** Give the SI unit of power.
- **Q.6** What is the relationship between watt and horse power ?
- **Q.7** What are the units of work and energy ?
- **Q.8** A cell converts one form of energy into another. Name the two forms.
- **Q.9** Name the device which converts electrical energy into mechanical energy.
- Q.10 Is energy a scalar quantity or a vector quantity?
- Q.11 What are the two different forms of mechanical energy?
- Q.12 How much work is done when a body of mass m is raised to a height h above the ground ?
- **Q.13** How much work is done when a force of 1 N moves a body through a distance of 1 m in its own direction ?
- Q.14 What is the power of a body which is doing work at the rate of one joule per second ?

B Short Answer Type Questions

Q.15 Write the formula for the work done on a body when the force is applied at an angle θ with the direction of motion of the body.

- **Q.16** A satellite revolves around the earth in a circular orbit. Calculate the work done by the force of gravity ?
- Q.17 In which of the following case the work done by a force will be maximum : when the angle between the direction of force and direction of motion is 0° or 90° ?
- **Q.18** State two situations in which a body moves with uniform speed and force acts on the body but work done on the body by the force acting is zero.
- **Q.19** What do you understand by the kinetic energy of a body ? Deduce the formula for kinetic energy.
- Q.20 On what factors does the kinetic energy of a body depend ?
- **Q.21** What is the difference between potential energy and kinetic energy ?
- Q.22 When a ball is thrown vertically upwards, its velocity goes on decreasing. What happens to its potential energy as its velocity becomes zero ?
- **Q.23** State whether the following objects possess potential energy, kinetic energy or both ?
 - (i) A flying aeroplane
 - (ii) A stretched spring
 - (iii) A rotating ceiling fan
 - (iv) A man climbing upstairs
 - (v) A stone placed on the roof
 - (vi) A running car
 - (vii)Water stored in a dam
- **Q.24** What do you understand by the term "transformation of energy" ? Explain with an example.

- Q.25 A car of mass 1000 kg moving with a speed of 10 m/s stops after moving a distance of 8 m after applying the brakes. Calculate the force applied by the brakes and work done by the brakes.
- Q.26 A car is being driven by a force of 2.5×10^{10} N. Travelling at a constant speed of 5 m/s, it takes 2 minutes to reach a certain place. Calculate the work done.
- Q.27 How much is the mass of a man if he has to do 2500 joules of work in climbing a tree 5 m tall ?
- Q.28 A man weighing 500 N carried a load of 100 N up a flight of stairs 4 m high in 5 seconds. What is the power ?
- **Q.29** An athlete weighing 60 kg makes a high jump of 1.8 m. Determine the following :
 - (i) kinetic energy at the highest point.
 - (ii) potential energy at the highest point.
- Q.30 If an electric bulb of 100 W is light up for 2 hrs, how much electrical energy will be consumed?
- Q.31 A person weighing 800 N carries a packet from the base camp B to point A of a hill at a height of 1200 m. The weight of the packet is 200 N. Calculate the following :
 - (i) How much work he does against gravity ?
 - (ii) What is the potential energy of the packet at A if it assumed to be zero at B ?
- Q.32 A man weighing 600 N carries a load of 100 N up a flight of stairs 4 m high in 5 s. Calculate the power.

- **Q.33** Water is falling on the blades of a turbine at the rate of 6×10^3 kg/min. The height of the fall is 10 m. Calculate the power of the motor to be used.
- Q.34 An electric motor drives a machine which lifts a mass of 2 kg through a height of 6 m, in 4 s at a constant speed. Assume g = 9.8 N kg⁻¹ and calculate (i) the amount of work done and (ii) the power of the machine to lift the mass of 2 kg.

C Long Answer Type Questions

- Q.35 Define the term work. What are the quantities on which the amount of work done depends ? How are they related to work ? What is the condition for a force to do work on a body?
- **Q.36** Write the formula for work done on a body when the body moves at an angle to the direction of force. Give the meaning of each symbol used. What will happen to the work done if angle θ between the direction of force and motion of the body is increased gradually? Will it increase, decrease or remain constant ?
- Q.37 Write an expression for the kinetic energy of a body of mass m moving with a velocity v. Explain by an example what is meant by potential energy. Write down the expression for gravitational potential energy of a body of mass m placed at a height h above the surface of the earth.
- **Q.38** How can you explain the oscillation of a simple pendulum on the basis of conservation of energy ?

EXERCISE - 2

Single Correct Answer Type Questions

- Q.1 Work done upon a body is-
 - (A) a vector quantity
 - (B) a scalar quantity
 - (C) (A) and (B) both are correct
 - (D) none of these
- Q.2 Work done -
 - (A) is always positive
 - (B) is always nagative
 - (C) can be positive, negative or zero
 - (D) none of these

Q.3 No work is done when -

- (A) a nail is plugged in a wooden board
- (B) a box is pushed along a horizontal floor
- (C) there is no component of force parallel to the direction of motion
- (D) there is no component of force perpendicular to the direction of motion
- Q.4 A body at rest can have :
 - (A) speed (B) velocity
 - (C) momentum (D) energy
- **Q.5** Types of mechanical energy are:
 - (A) kinetic energy only
 - (B) potential energy only
 - (C) kinetic energy and potential energy both
 - (D) neither kinetic energy nor potential energy
- Q.6 Work means: (A) effort (B) interview (C) achievement (D) get-together
- **Q.7** Work is done on a body when :
 - (A) force acts on the body but the body is not displaced
 - (B) force does not act on the body but it is displaced

- (C) force acts on the body in a direction perpendicular to the direction of the displacement of the body
- (D) force acts on the body and the body is either displaced in the direction of force or opposite to the direction of force
- **Q.8** Force F acts on a body such that force F makes an angle θ with the horizontal direction and the body is also displaced through a distance S in the horizontal direction, then the work done by the force is -

(A) FS	(B) FS cos θ
(C) FS sin θ	(D) zero

- Q.9 In tug of war work done by winning team is :
 (A) zero
 (B) positive
 (C) negative
 (D) none of these
- Q.10 In tug of war work done by loosing team is : (A) zero (B) positive (C) negative (D) none of these
- Q.11 Work done by the force of gravity, when a body is lifted to height h above the ground is :
 (A) zero
 (B) positive
 (C) negative
 (D) none of these
- **Q.12** When work is done on a body:
 - (A) it gains energy
 - (B) it looses energy
 - (C) its energy remains constant
 - (D) none of these
- Q.13 Choose correct relation :
 - (A) 1 J = 10^5 erg
 - (B) $1 J = 10^7 erg$
 - (C) $1 J = 10^3 erg$
 - (D) none of these

- Q.14 The kinetic energy of an object is K. If its velocity is doubled than its kinetic energy will be
 - (A) K (B) 2K (C) $\frac{K}{2}$ (D) 4K
- Q.15 Two bodies of mass 1 kg and 4 kg possess equal momentum. The ratio of their K.E.

(A) 4 : 1	(B) 1 : 4
(C) 2 : 1	(D) 1 : 2

Q.16 Which one is not the unit of energy? (A) kilocalorie (B) kWh (C) erg (D) watt

Q.17	1 kg mass has K.E. of 1 J when its speed is							
	(A) 0.45 ms^{-1}	(B) 1 ms^{-1}						
	(C) 1.4 ms^{-1}	(D) 4.4 ms ⁻¹						

- Q.18 When you compress a spring you do work on it. The elastic potential energy of the spring(A) increases
 (B) decreases
 (C) disappears
 (D) remains constant
- Q.19 When a ball is thrown upward, its total energy-(A) increases(B) decreases(C) remains same(D) none of these
- Q.20 If a stone of mass 'm' falls a vertical distance 'd' the decrease in gravitational potential energy is-

(A)
$$\frac{Mg}{d}$$
 (B) $\frac{Mg^2}{2}$

- (C) mgd (D) $\frac{Mg}{d^2}$
- Q.21 An object of mass 10 kg falls from height 10 m.. Kinetic energy gained by the body will be approximately equal to-
 - (A) 1000 J (B) 500 J
 - (C) 100 J (D) None of these

- Q.22 A spring is stretched. The potential energy in stretching the spring-(A) remains the same (B) increases
 - (C) decreases (D) becomes zero
- Q.23 The potential energy of a boy is maximum when he is-
 - (A) standing
 - (B) sleeping on the ground
 - (C) sitting on the ground
 - (D) sitting on chair
- Q.24 The potential energy of a freely falling object decreases continuously. What happens to the loss of potential energy ?
 - (A) It is continuously converted into sound energy
 - (B) it is continuously converted into kinetic energy
 - (C) it is continuously destroyed
 - (D) None of these
- Q.25 A device which converts mechanical energy into electrical energy is known as-
 - (A) electric motor (B) lever
 - (C) generator (D) microphone
- **Q.26** The value of g on moon is $1/6^{th}$ of the value of g on the earth. A man can jump 1.5 m high on the earth. On moon he can jump up to a height of-
 - (A) 9 m (B) 7.5 m (C) 6 m (D) 4.5 m
- Q.27 A raised hammer possess-
 - (A) kinetic energy only
 - (B) gravitational potential energy
 - (C) electrical energy
 - (D) sound energy
- **Q.28** An object of mass 1 kg has a P.E. of 1 J relative to the ground when it is at a height of : $(g = 9.8 \text{ m/s}^2)$.
 - (A) 0.10 m (B) 10 m (C) 9.8 m (D) 32 m

Q.29 To lift a 5 kg mass to a certain height, amount of energy spent is 245 J. The mass was raised to a height of-

(A) 15 m	(B) 10 m
(C) 7.5 m	(D) 5 m

Q.30 Chlorophyll in the plants convert the light energy into-

(A) heat energy (B) chemical energy

(C) mechanical energy(D) electrical energy

- Q.31 Kilowatt is the unit of-
 - (A) energy(B) power(C) force(D) momentum
- Q.32 Work is product of time and-(A) energy (B) power (C) force (D) distance
- Q.33 A young son work quickly for two hours and prepares 16 items in a day. His old father works slowly for eight hours and prepare 24 items a day.
 - (A) son has more power
 - (B) son has more energy
 - (C) both have equal power
 - (D) both have equal energy

Q.34	One horse power is	
	(A) 746 W	(B)

- (C) 980 W (D) 32 W
- Q.35 Power of a moving body is stored in the form of-

550 W

- (A) Work and distance
- (B) force and distance
- (C) force and velocity
- (D) force and time
- Q.36 A weight lifter lifts 240 kg from the ground to a height of 2.5 m in 3 second his power is(A) 1960 W
 (B) 19.6 W
 (C) 1.96 W
 (D) 196 W
- Q.37 Which of the following is not the unit of power? (A) I/s (B) Watt

$(\mathbf{A}) \mathbf{J}/\mathbf{S}$	(D) wall
(C) kJ/h	(D) kWh

EXERCISE - 1

6.	1 watt = 746 H.P	12. mgh	13. 1 Joule	14. 1 watt
25.	6250 N, 5×10^6 J	26. $15 \times 10^{14} \text{ J}$	27. 50 kg	28. 480 W
29.	(i) zero, (ii) 1080 J	30. 0.2 kWh	31. (i) 12×10^5 J, (ii) 2.4×10^5 J	32. 560 W
33.	10 kW	34. (i) 117.6 J (ii) 29.4 W		

EXERCISE - 2

Ques	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Ans	В	С	С	D	С	C	D	В	В	С	С	Α	В	D	Α
Ques	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Ans	D	С	Α	С	С	Α	В	Α	В	С	Α	В	Α	D	В
Ques	31	32	33	34	35	36	37								
Ans	В	В	Α	Α	С	Α	D								