

Ch 11 Work and Energy

One mark questions

- Q1 Define 1 joule of work.
- Q2 When a ball is thrown vertically upwards its velocity goes on decreasing. What happens to its potential energy as its velocity becomes zero?
- Q3 State the law of conservation of energy .Give an example.
- Q4 Define power. Give its SI unit.
- Q5 What is meant by potential energy? Is it a scalar or vector quantity?

Two mark questions

- Q1 A boy of mass 45 kg climbs up 20 steps in 20 sec. If each step is 25 cm high , calculate the power of the boy used in climbing. ($g=10\text{m/s}^2$)
- Q2 What kilowatt hour? Convert it into joules.
- Q3 An electric heater is rated 1500 W . How much energy does it use in 10 hours?
- Q4 Can a body have energy without having momentum? Explain.
- Q5 Two bodies of equal masses move with the uniform velocities v and $3v$ respectively. Find the ratio of their kinetic energies.

Three mark questions

- Q1 Explain how the total energy of a swinging pendulum at any instant of time remains conserved. Illustrate your answer with the help of a labelled diagram.
- Q2 i) A coolie holding a heavy box is waiting at the bus stand for 15 minutes. How much work is done?
ii) A man carrying 70 kg carries a weight of 10 kg on the top of the tower 100m high. Calculate the work done by the man. ($g=10\text{m/s}^2$)
- Q3 When the work done by a force said to be negative? Give one situation in which one of the forces acting on the object is doing positive work and the other is doing negative work.
- Q4 a) Write an expression for potential energy of an object of mass m raised through a height h .
b) Find the energy possessed by an object of mass 10 kg when it is raised to a height of 6 m above the ground. ($g=9.8\text{m/s}^2$)
- Q5 The earth moving around the sun in a circular orbit is acted upon by a force and hence work must be done on the earth by the force. State whether the statement is correct or not. Give reasons for your answer.

Five mark questions

- Q1 (i) Derive an expression for the kinetic energy of an object. Write the SI unit of kinetic energy.
ii) A body of mass 4 kg initially at rest is subjected to a force of 16 N. What is the kinetic energy acquired by the body at the end of 10 s?

- Q2 (i) Define the term work. Write the formula or the work done by a body in moving up against gravity.
- ii) What happens to the work done when the displacement of a body is at right angles to the direction of force acting on it? Explain your answer.
- iii) A person of mass 50 kg climbs a tower of height 72 metres. Calculate the work done. ($g=9.8\text{m/s}^2$)

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