Chapter 11 – Work and Energy

Question 1: A force of 7 N acts on an object. The displacement is, say 8 m, in the direction of the force (Fig. 11.3). Let us take it that the force acts on the object through the displacement. What is the work done in this case?

Answer: When a force F acts on an object to displace it through a distance S in its direction, then the work done W on the body by the force is given by:
Work done = Force × Displacement
W = F × S
Where,
F = 7 N
S = 8 m
Therefore, work done, W = 7 × 8
= 56 Nm
= 56 J

Question 1: When do we say that work is done?

Answer: Work is done whenever the given conditions are satisfied:
(i) A force acts on the body.
(ii) There is a displacement of the body caused by the applied force along the direction of the applied force.

Question 2:Write an expression for the work done when a force is acting on an object in the direction of its displacement.

Answer:When a force F displaces a body through a distance S in the direction of the applied force, then the work done W on the body is given by the expression:
Work done = Force × Displacement
W = F × s

Question 3:Define 1 J of work.

Answer:1 J is the amount of work done by a force of 1 N on an object that displaces it through a distance of 1 m in the direction of the applied force.

Question 4:A pair of bullocks exerts a force of 140 N on a plough. The field being ploughed is 15 m long. How much work is done in ploughing the length of the field?

Answer:Work done by the bullocks is given by the expression:
Work done = Force × Displacement
W = F × d
Where,
Applied force, F = 140 N
Displacement, d = 15 m