Class – XI
Physics

CHAPTER 6: WORK, ENERGY AND POWER

1. What is scalar product or dot product?

Ans: The scalar product or dot product of any two vectors A and B , denoted as A.B (read as A dot B) is defined as

A.B = A B cosθ , where θ is the angle between the vectors A and B.

2. Find the angle between force F= 3î+4ĵ-5k̂ and displacement d= 5î +4ĵ +3k̂ unit. Also find the projection of F on d.

Ans: Refer to textbook page no 115 example 6.1.

3. Derive an expression for total work done by a variable force.

Ans: Refer to textbook page no 118(6.5) .

4. What is energy?

Ans: Energy of a body is its capacity of doing work. It is a scalar quantity. Its S1 unit is joule and CGS unit is erg. Its dimensional formula is $[ML^3T^{-3}]$.

5. What is mechanical energy?

Ans: The sum of kinetic and potential energies at any point remains constant throughout the motion. It does not depend upon time. This is known as law of conservation of mechanical energy.

6. Proof Work- Energy theorem for a variable force.

Ans: Refer to textbook page no 119(6.6) .

7. Write down Principle of Conservation of Mechanical Energy.

Ans: For conservative forces the sum of kinetic and potential energies of any object remains constant throughout the motion.

8. What is elastic collision?

Ans: The collision in which both the momentum and the kinetic energy of the system remains conserved are called elastic collisions.

In an elastic collision all the involved forces are conservative forces.

9. What is inelastic collision?

Ans: The collision in which only the momentum remains conserved but kinetic energy does not remain conserved are called inelastic collisions.

In an inelastic collision some or all the involved forces are non-conservative forces.

10. What is power?

Ans: The time rate of work done by a body is called its power.

Power = Rate of doing work = Work done / Time taken

If under a constant force F a body is displaced through a distance s in time t,

The power, p = W / t = F * s / t

$\therefore P = F * v = F\ v \cos\theta$, where θ is the smaller angle between F and v.

Power is a scalar quantity. Its SI unit is watt and its dimensional formula is $[ML^2T^{-3}]$.

HOMEWORK:- NCERT textbook exercise question no 6.1, 6.2, 6.6, 6.7, 6.11, 6.14, 6.15, 6.20.