CLASS : XI PHYSICS ASSIGNMENT NO. IV UNIT : IV, CHAP : WORK ENERGY & POWER

1 Mark Type

Q1. State the factors on which the work done by a force depends.
Q2. What is the work done by the force of tension in the string of simple pendulum?
Q3. Moment of force and work done by a force have same units. What is the difference between them?
Q4. Which physical quantities are concerned in an elastic collision? Q5.Fricton is non-consecutive force. How?
Q6. What is the significance of the – ve sign in w = -mgd? Q7. Relate 1 kwh = 1j
Q8. A mass m collides with another mass 2m and sticks to it. What is the nature of the collision?
Q9. A mass is moving in a circular path with constant speed. What is the work done in $3/4^{th}$ of a rotation?
Q10. Draw the variation of P.E. stored in a spring as a function of extension.
Q11. Mountain roads rarely go straight up but wind up gradually. Why?
Q12. What is meant by mass energy equivalence? Discuss. Q13. Is its possible to have a situation when $E - U < 0$?
Q14. What are the dimensions of power? How many walls are there in one horse power?

2/3 marks type

Q15. Derive an expression for the kinetic energy of a body of mass m moving with velocity 'v' by calculus method.
Q16. Two springs A & B with constants K_A and K_B ($K_A > K_B$) are given. In which of the spring more work is to be done, if,
(i) they are stretched by the same amount. (ii) they are stretched by same force.
Q17. By what factor the velocity of a body should be increased so that its K.E. is increased by a factor of nine? Justify.
Q18. Prove that bodies of identical masses incharge their velocities after head – on elastic collision.
Q19. A body of mass 4 Kg. initially at rest is subject to force 16N. What is kinetic energy acquired by the body at the end of 10S?
Q20. A body is moving unidirectional under the influence of a source of constant power. Its displacement in time t is proportional to: - (i) $t^{½}$ (ii) t (iii) $t^{3/2}$ (iv) t^2
Q21. State & prove work energy theorem.
Q22. Discuss Elastic collision in 1-D. Obtain expression for velocities of two bodies after such a collision.
Q23. The blades of windmill sweep out a circle of area A (a) if wind flows at velocity v perpendicular to circle, what is mass of air passing through it in time t? (b) What is kinetic energy of air? (c) Assume that windmill converts 25% of wind's energy into electrical energy. Given $A = 30m^2$, V = 36 km/hr & density of air = 1.2 kg m^{-3}. What is electrical power produced?
Q24. A pump on the grd floor of a building can pump up water to fill a tank of volume 30 m^3 in 15 min. If the tank is 40 m above the grd, and the efficiency of the pump is 30%, how much electric power is consumed by the pump ?
Q25. A particle moves along x-axis from x = 0 to x = 5m under influence of force $F = 7 - 2x + 3x^2$. Find work done in process.
Q26. A shot traveling at rate 100 ms^{-1} is just able to pierce plank 4cm thick. What velocity is reqd to just pierce plank 9cm thick?
Q27. A 10 Kg. ball a 20 kg. ball approach each other with velocities 20 ms^{-1} & 10 ms^{-1} respectively. What are their velocities after collision if the collision is perfectly elastic ?