Worksheet: Work and Energy

NIOS · Class 9 · Science · 15 questions · 43 marks

Name: _____ Date: _____ Score: _____ / 43

Q1. Define work and state its SI unit. *[1 mark]*

Q2. Find the kinetic energy of a 2 kg object moving at 10 m/s. *[1 mark]*

Q3. A 5 kg object is raised to a height of 3 m. Find its potential energy. (g = 10 m/s²) *[1 mark]*

Q4. Give two examples where the force applied on an object does zero work. *[2 marks]*

Q5. A man lifts a load of 20 kg through a height of 5 m in 10 s. Find the work done and his power. (g = 10 m/s²) *[2 marks]*

Q6. A 2 kg ball moving at 5 m/s is brought to rest by a force of 20 N. How far does it travel before stopping? *[3 marks]*

Q7. A ball of mass 0.5 kg is dropped from a height of 10 m. Find its kinetic energy and velocity just before it hits the ground. (g = 10 m/s²) *[3 marks]*

Q8. An electric bulb of 100 W is used for 10 hours daily. Calculate the energy consumed in 30 days in (a) joules, (b) kilowatt-hours. *[3 marks]*

Q9. A ball thrown upward decelerates from 20 m/s to 0 m/s while rising a height of 20 m. Calculate (a) the work done by gravity on the ball, (b) the change in its kinetic energy. (m = 1 kg, g = 10 m/s²) *[3 marks]*

Q10. Two bodies A and B of masses 1 kg and 4 kg have the same kinetic energy. Find the ratio of their velocities. *[3 marks]*

Q11. A 100 g cricket ball moving horizontally at 30 m/s is brought to rest by a fielder's hands in 0.1 s. Calculate (a) the average force exerted by the fielder's hands, (b) the work done by the hands. *[4 marks]*

Q12. A stone of mass 2 kg is thrown vertically upward with an initial velocity of 20 m/s. Find (a) the maximum height reached, (b) the total energy at any point during the motion. (g = 10 m/s²) *[4 marks]*

Q13. A household uses 5 bulbs of 60 W each for 5 hours a day, 1 fan of 75 W for 8 hours a day, and a fridge of 100 W running continuously. Calculate the daily and monthly (30 days) electricity consumption in kWh, and the cost at Rs. 6 per unit. *[4 marks]*

Q14. An object of mass 40 kg is raised through a height of 5 m on the moon. Compare the work done with that on Earth. Also, when the object is dropped from this height, find its velocity just before hitting the ground (a) on Earth, (b) on Moon. ($g_E = 10\ m/s^2$, $g_M = 1.6\ m/s^2$) *[5 marks]*

Q15. Why is the kinetic energy of a body always positive while its potential energy can be positive, negative or zero? *[4 marks]*