

Work done, power and mechanical energy

Physics grades 9-10 (GCSE · IGCSE · O Level · Class 9-10) · Test

Name: _____ Date: _____ Class: _____ Mark: ____ / 20

This test covers work, power, kinetic energy and gravitational potential energy. Write the equation, show the substitution and give units. Use $g = 9.8 \text{ N/kg}$. Calculators are allowed. The total is 20 marks.

Level: Physics grades 9-10 (GCSE · IGCSE · O Level · Class 9-10) · **Curriculum:** HS-PS3-1

Time: 40 minutes · 8 questions · Total: 20 marks · Calculator allowed

Question 1 Equations (2 marks)

Write each equation in symbols.

- The power developed when work W is done in time t . (1 mark)
- The gravitational potential energy gained by a mass m raised through height h . (1 mark)

Question 2 Pushing a mower (3 marks)

Wanjiru pushes a lawnmower with a force of 80 N through 25 m in 40 s.

- Calculate the work done. (1 mark)
- Calculate the power. (2 marks)

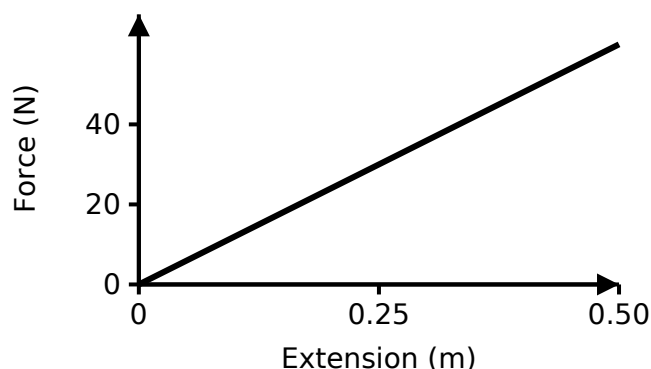
Question 3 Motorcycle (3 marks)

A motorcycle of mass 220 kg moves at 15 m/s.

- Calculate its kinetic energy. (2 marks)
- State its kinetic energy at 30 m/s. (1 mark)

Question 4 Ball thrown upwards (2 marks)

A ball of mass 0.20 kg rises to a height of 6.0 m. Use $g = 9.8 \text{ N/kg}$. Calculate the gain in gravitational potential energy. (2 marks)

Question 5 Stretching a spring (3 marks)*Force against extension for a spring.*

The graph shows the force needed to stretch a spring.

- Calculate the work done in stretching the spring by 0.50 m. (2 marks)
- State what the area under the graph represents. (1 mark)

Question 6 Stopping distance (4 marks)

A car of mass 900 kg moves at 10 m/s. The brakes apply a constant force of 3000 N.

- Calculate the kinetic energy of the car. (2 marks)
- Calculate the distance in which the car stops. (2 marks)

Question 7 Carrying a bag (2 marks)

A student carries a heavy bag along a level corridor at constant speed. Explain why the upward force on the bag does no work. (2 marks)

Question 8 Unit of power (1 mark)

State the unit of power in terms of joules and seconds. (1 mark)