Practice Question Set For GCSE
Subject : Physics
Paper-2 Topic : 8_Energy Forces Doing Work

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Name of the Student:_____
Max. Marks : 22 Marks **Time : 22 Minutes**

Q1.

Figure 6 shows a 'Mars rover' descending to the surface of the planet Mars.

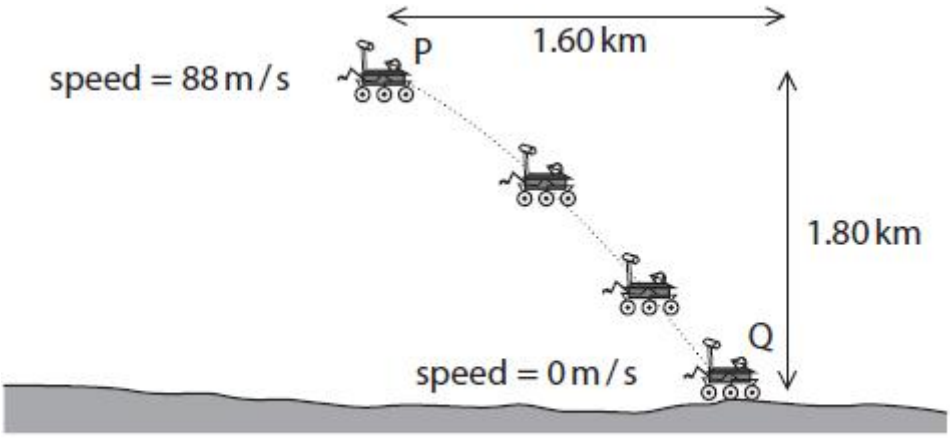

Figure 6

(i) Calculate the change in gravitational potential energy of the rover as it descends from position P to position Q.

Mass of rover = 1100 kg
Gravitational field strength on Mars = 3.7 N / kg
Give your answer to 2 significant figures.

(3)

change in gravitational potential energy = ... J

(ii) Use data from Figure 6 to calculate the change in kinetic energy of the rover as it descends from position P to position Q.

(2)

change in kinetic energy = ... J

(iii) The rover is slowed down safely using thrusters and a parachute (not shown in Figure 6).

The thrusters use jets of gas to control movements and the parachute is designed to be used in the atmosphere of Mars.
Describe the energy changes involved in terms of the work done by various forces as the rover descends.

(3)

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(Total for question = 8 marks)

Q2.

Figure 4 shows a drone.

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Figure 4

A different drone has a mass of 4.5 kg.

This drone rises from the ground to a height of 20 m.

(i) Calculate the change in gravitational potential energy when the drone rises through a height of 20 m.

The gravitational field strength g = 10 N/kg.

(2)

change in gravitational potential energy = ... J

(ii) State the amount of useful work done by the blades as the drone rises through 20 m.

(1)

useful work done = ... J

(iii) It takes 4 s for the drone to rise through 20 m.

Calculate the useful power developed by the blades in this time of 4 s.

(2)

useful power developed = ... W

(Total for question = 5 marks)

Q3.

Figure 8 shows an athlete training with a push sled.

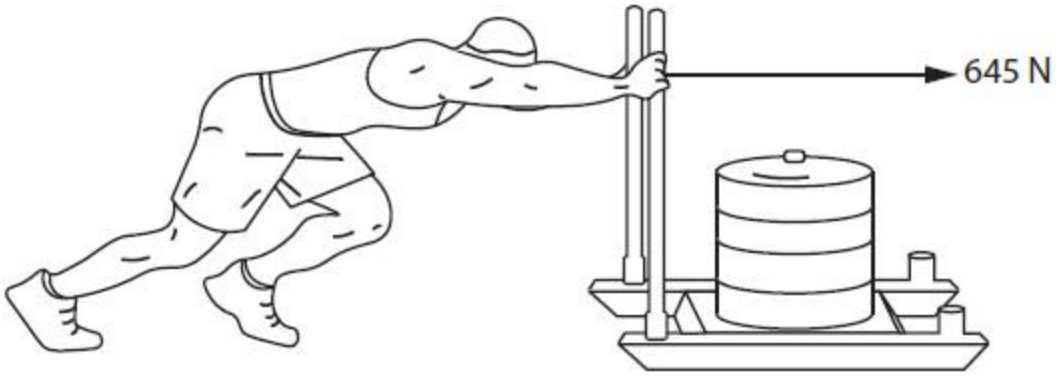

Figure 8

The athlete pushes the sled with a force of 645 N.

Calculate the distance the sled moves when the force of 645 N does 7440 J of work on the sled.

Give your answer to an appropriate number of significant figures.

(3)

distance moved = ... m

(Total for question = 3 marks)

Q4.

An electric car is travelling at a speed of 16.0 m/s.

The total mass of the car is 1200 kg.

(i) Calculate the kinetic energy, in kJ, of the car.

(2)

kinetic energy = ... kJ

(ii) On a journey, the car transfers energy from the battery at an average rate of 17.5 kW.

The battery in the car transfers a total of 126 MJ of energy before it becomes discharged.
Calculate the time taken for the battery to become discharged on this journey.
Give your answer in hours.

(2)

time taken = ... hours

(iii) Figure 10 shows an electrical device connected to the wheels of an electric car.

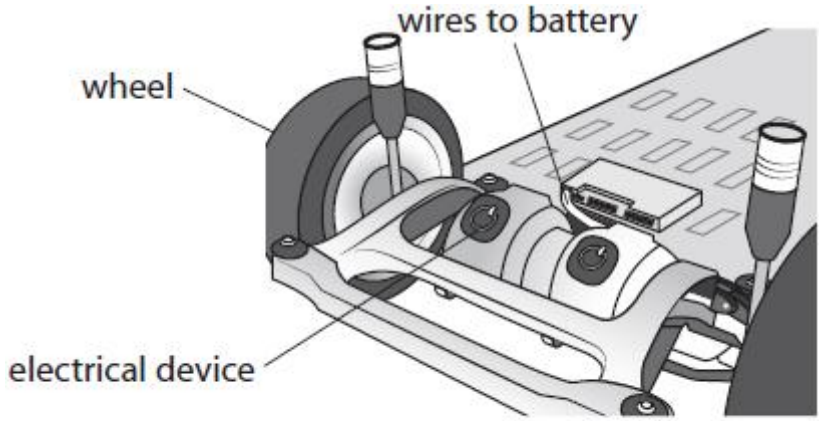

Figure 10

The electrical device is used as a motor when the car accelerates and as a dynamo when the car decelerates.
Explain how using the device can help to increase the time that the car can be driven before the battery becomes discharged.

(2)

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(Total for question = 6 marks)