Practice Question Set For GCSE
Subject : Physics
Paper-1 Topic : 2_Motion and Forces

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Name of the Student:_____
Max. Marks : 21 Marks **Time : 21 Minutes**

Q1.

* Figure 13 shows two objects, Q and R, before and after they collide.

Figure 13

The arrows show the direction of movement of the objects.
The arrows are not to scale.

Explain how momentum is conserved in the collision.

Use Newton's third law and Newton's second law in your answer.

Newton's second law can be written as

$$\text{force} = \frac{\text{change in momentum}}{\text{time}}$$

(6)

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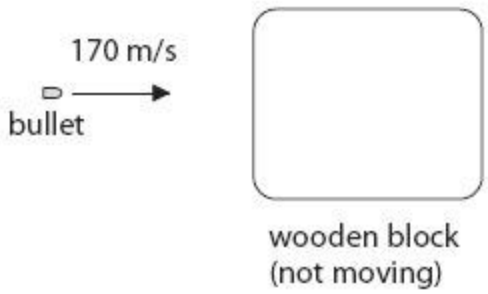
(Total for question = 6 marks)

Q2.

(a) The diagram shows a bullet moving towards a wooden block.



(i) The bullet is moving with a velocity of 170 m/s.
The mass of the bullet is 0.030 kg.

Show that the momentum of the bullet is about 5.0 kg m/s.

(1)

(ii) The bullet collides with the wooden block and sticks in it.
The bullet and the wooden block move off together.
The mass of the wooden block is 0.80 kg.

Calculate the velocity of the wooden block and bullet immediately after the collision.

(3)

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(iii) The collision between the bullet and the wooden block is an inelastic collision.

State what is meant by an **inelastic collision.**

(2)

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(b) An electron and a positron collide and annihilate each other.
Two photons are produced.

(i) Explain why two photons must be produced, rather than just one.

(2)

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(ii) Calculate the minimum total energy of the photons produced when an electron and positron collide.

Use the equation

$E = mc^2$

mass of an electron = 9.1×10^{-31} kg

speed of light = 3.0×10^8 m/s

(2)

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(Total for Question = 10 marks)

Q3.

A car starts from rest and then travels for 70 s as shown on the graph in Figure 5.

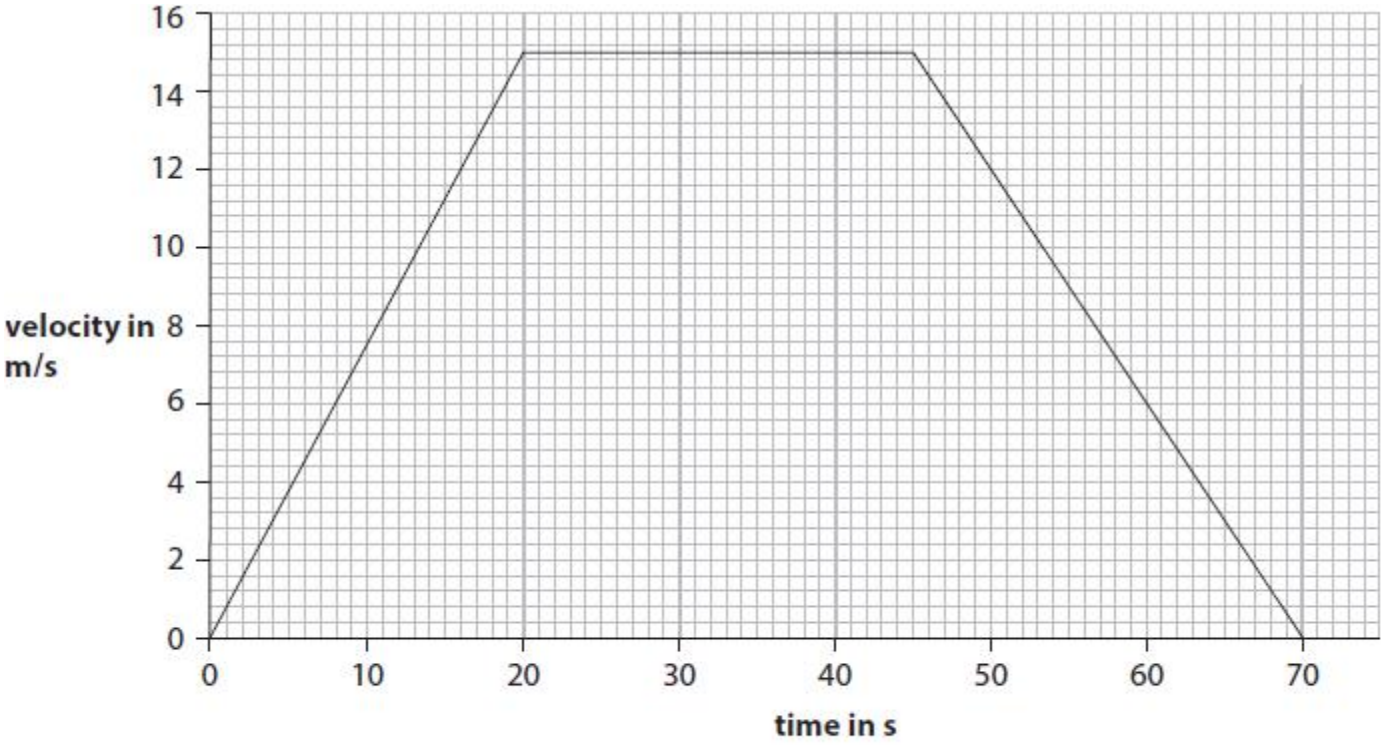

Figure 5

(i) Complete the sentence using data from Figure 5.

(1)

The car is travelling at constant velocity from ..... s to ..... s.

(ii) Use data from the graph in Figure 11 to show that the car travels a total distance of about 710 m in 70 s.

(3)

(iii) Calculate the average speed of the car for the total distance travelled.

(1)

average speed = ... m/s

(Total for question = 5 marks)