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

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Name of the Student:_____
Max. Marks : 20 Marks **Time : 20 Minutes**

Q1.

A pilot begins to land an aircraft.
When the aircraft lands, the momentum of each passenger also changes.
(i) Explain why it is more comfortable for a passenger if the aircraft takes a longer time to slow down.

(2)

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(ii) Suggest why some aircraft need a very long runway to land safely.

(2)

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Q2.

Two students try to determine a value for *g*, the acceleration due to gravity.

(i) They measure the time, *t*, for a small steel ball to fall through a height, *h*, from rest.

They measure *t* to be 0.74 s, using a stopwatch.
They measure *h* to be 2.50 m, using a metre rule.
Calculate a value for *g* from the students' measurements.
Use the equation

$$g = \frac{2h}{t^2}$$

(2)

g = ... m/s^2

(ii) They record the time *t* for two more drops from the same height.

The three values for time *t* are

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0.74 s, 0.69 s, 0.81 s.

Calculate the average value of time *t* to an appropriate number of significant figures.

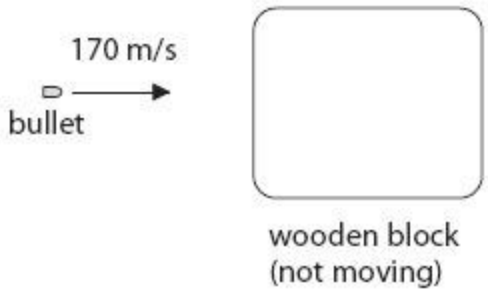
(2)

average value of time *t* = ... s

(Total for question = 4 marks)

Q3.

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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Q4.

Andrew skis down a hill.



Andrew returns to the top of the hill and starts again.

(i) His mass is 67 kg.

Show that his momentum is about 2000 kg m/s when his velocity is 31 m/s.

(2)

(ii) He falls over when his momentum is 2000 kg m/s.

After he falls over, he slows down by sliding across the snow.
It takes 2.3 s for his momentum to reduce to zero.
Calculate the average force on Andrew as he slows down.

(2)

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(iii) Andrew is not injured by the fall even though he was moving quickly.

Use ideas about force and momentum to explain why he is not injured.

(2)

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