Practice Question Set For GCSE
Subject : Physics
Paper-1 Topic : Motion And Forces

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Name of the Student:_____

Max. Marks : 20 Marks   **Time : 20 Minutes**

Q1.

Shot-put is an Olympic event.
The shot is a heavy ball.
An athlete throws the shot as far as possible.

A sports scientist analyses an athlete's throw to help improve performance.

The scientist takes pictures of the athlete every 0.1 s during one throw.

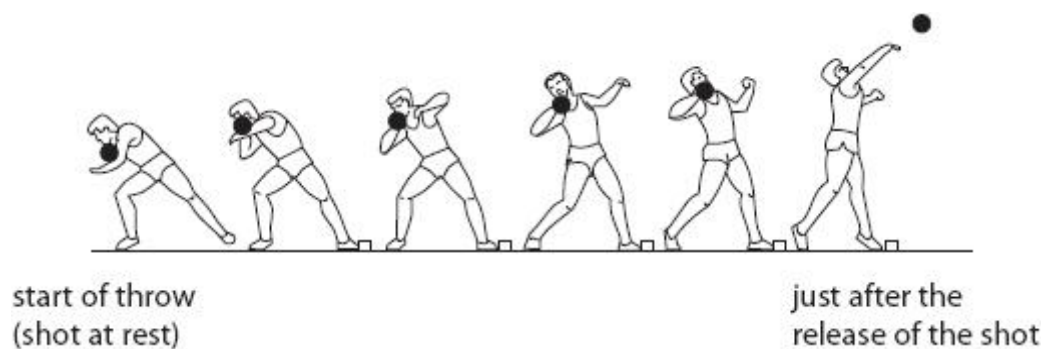Figure 6 shows the pictures of one throw.

start of throw   just after the
(shot at rest)   release of the shot

Figure 6

(i) Estimate the amount of time during the throw when the shot is in the athlete's hand.

(1)

time = ... s

(ii) Explain how the scientist could improve this method of analysing the throw.

(2)

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(iii) The average acceleration of the shot while in the athlete's hand is 20.6 m/s^2.

The mass of the shot is 7.26 kg.
Calculate the average force that the athlete applies to the shot during the throw.

(2)

force = ... N

(iv) In another throw, the shot is in the athlete's hand for 0.48 s.

The average acceleration during this time is 23 m/s^2.
Calculate the velocity of the shot as it leaves the athlete's hand.

(3)

velocity = ... m/s

(Total for question = 8 marks)

Q2.

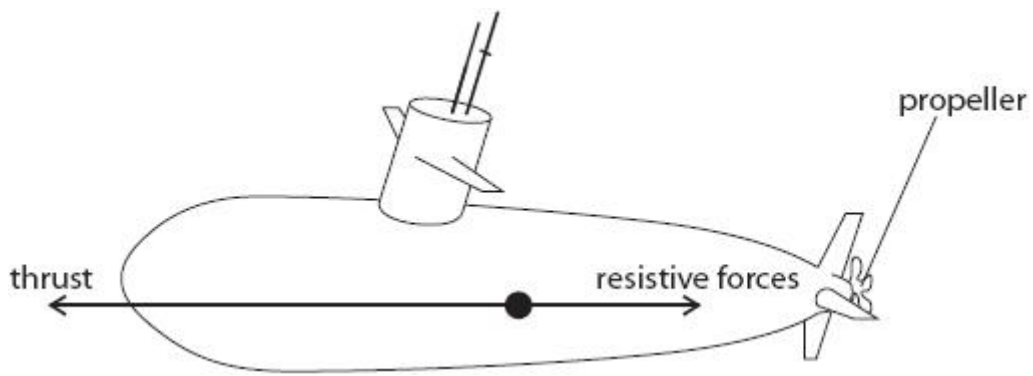Figure 7 shows a submarine being propelled forward underwater.

Figure 7

The thrust and the resistive forces are represented in magnitude and direction by the arrows in Figure 7.

* A submerged submarine is stationary.
The engines are put on maximum power.
The submarine moves forward.
The engines maintain maximum power.
The forces resisting the movement of the submarine increase as its speed increases.

The submarine remains horizontal. Explain how the forces acting on the submarine affect its acceleration up to and after it reaches its maximum possible speed.

(6)

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(Total for question = 6 marks)

Q3.

Figure 15 shows two trolleys, **P** and **Q**, moving at the same speed, v, directly towards each other.

Figure 15

The trolleys have the same mass.

When the trolleys collide, they stick together and stop.

Explain how momentum and energy are both conserved in this collision.

(6)

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(Total for question = 6 marks)