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

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**Name of the Student**:_____

**Max. Marks : 18 Marks**                                              **Time : 18 Minutes**

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Q1.

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

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)**

Q2.

Some students investigate a model of the craters produced by meteorite impacts.
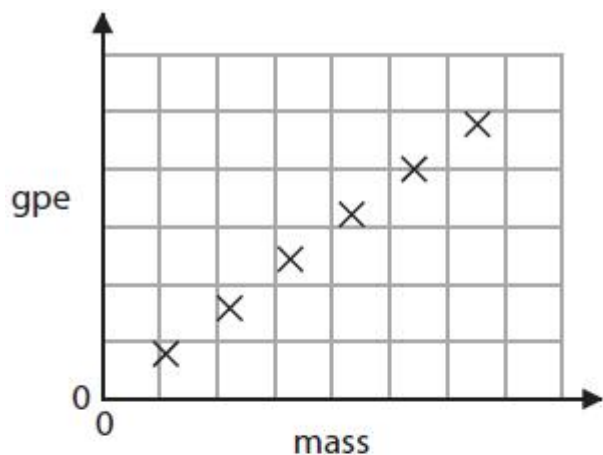
They drop balls into a tray filled with sand.

They use six balls with different masses.
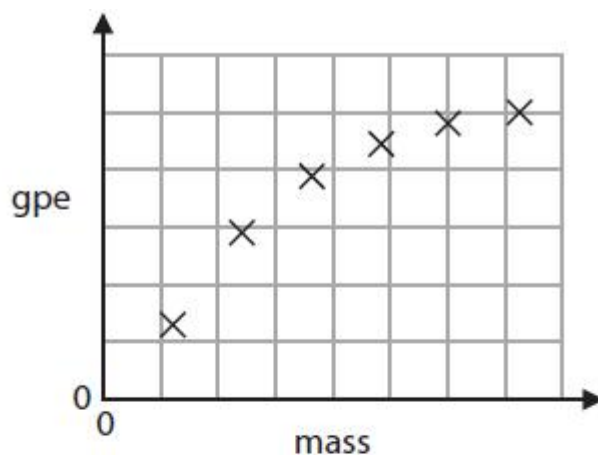
They drop each ball from the same height.

(a)  (i) Which one of these graphs shows the relationship between the gravitational potential energy (gpe) of the balls and their mass when they are all at the same height?
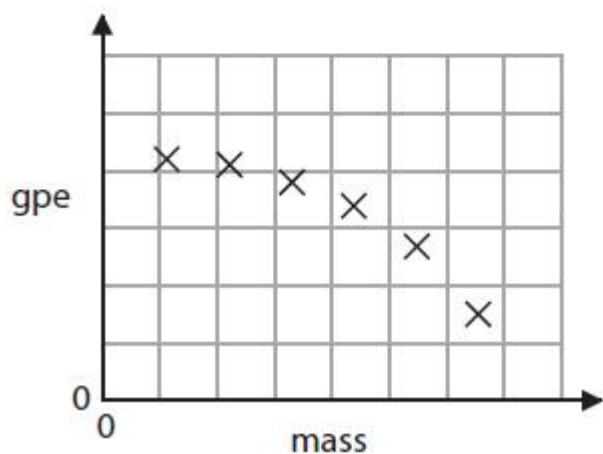
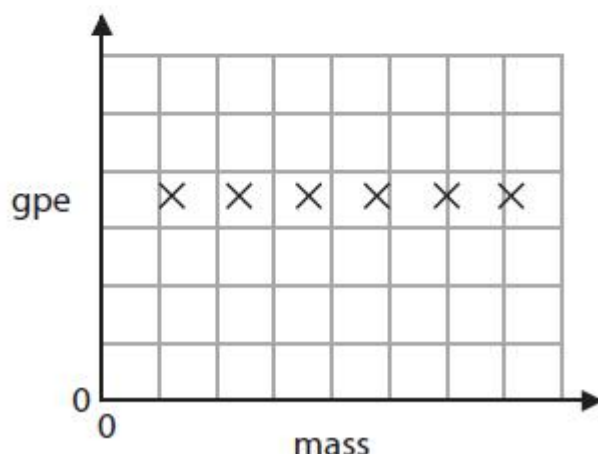Put a cross (☒) in the box next to your answer.

(1)

☒  A

☒  B

☒  C

☒  D

(ii)  Describe how the energy of a ball changes as it drops towards the sand.

(2)

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(b)  This photograph shows the sand after several balls have hit it.
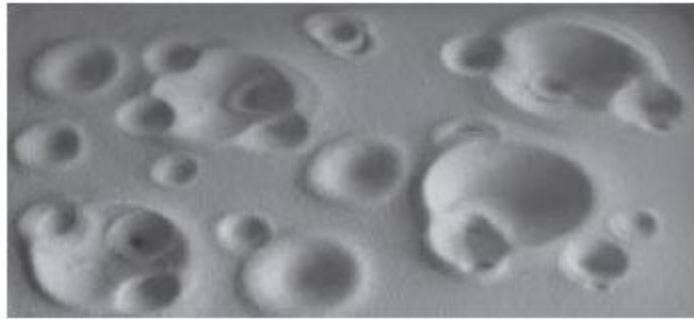
The students read this information in a textbook:

'When work is done, energy is transferred.'

Explain how work is done when the balls impact on the sand.

(2)

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(c) When one ball hits the sand, it has a velocity of 6.2 m/s.

It has a momentum of 0.46 kg m/s.
(i) Calculate the mass of the ball.

(3)

mass of ball = ......................................................... kg

(ii) The ball takes 0.17 s to come to rest after it hits the sand.
Calculate the average impact force.

(2)

average impact force = ......................................................... N

Q3.

A student investigates the motion of a trolley along a horizontal runway.

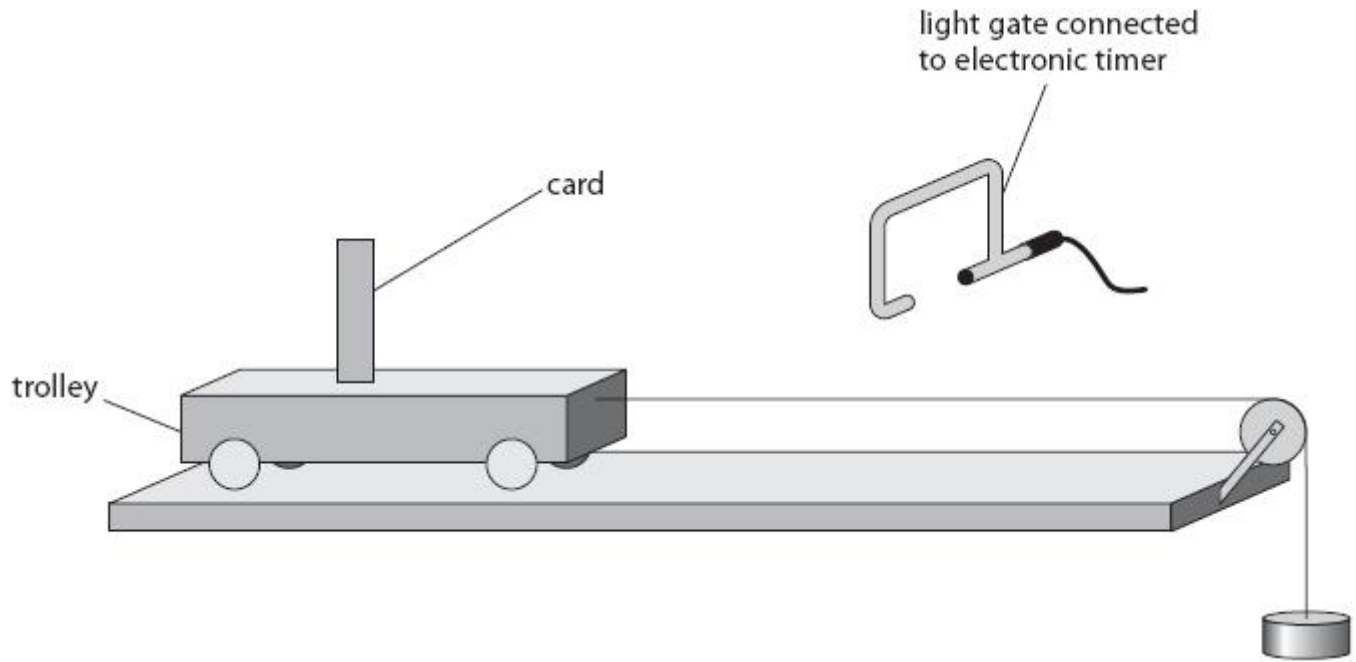Figure 9 shows the apparatus.



**Figure 9**

The trolley is attached to a string passing over a pulley.

A 100 g metal disc hangs on the end of the string.

The light gate measures the time it takes for the card to pass through it.

The student repeats the process several times by adding extra 100 g metal discs.

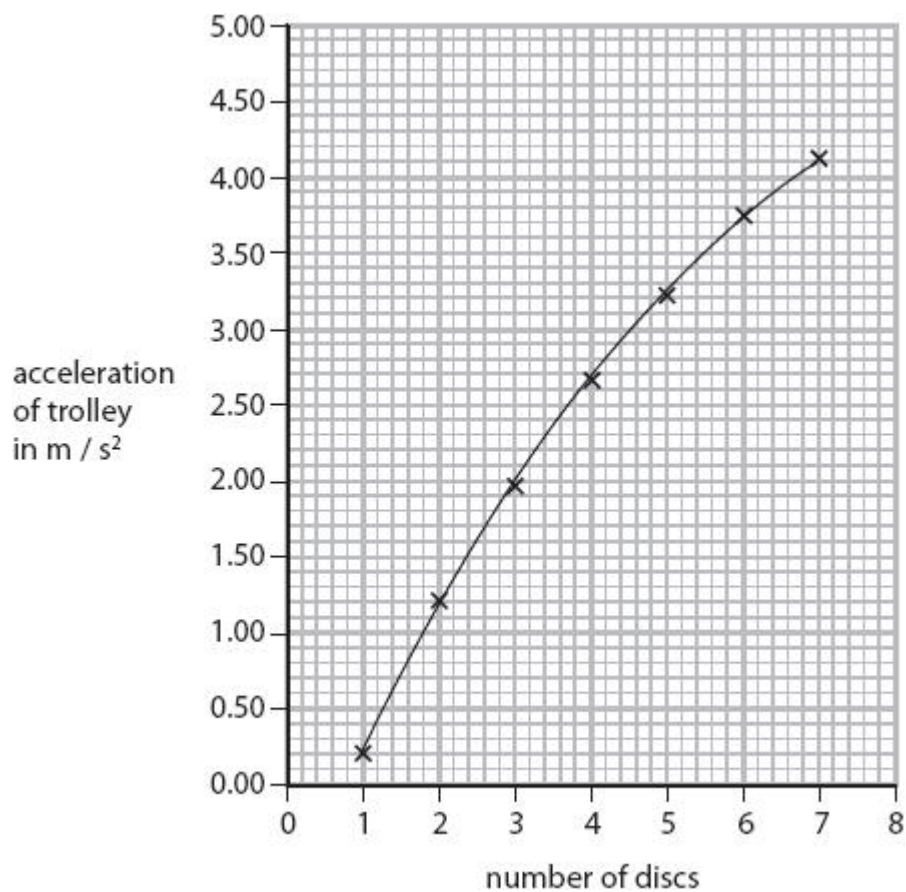Figure 10 shows a graph of the results.

**Figure 10**

(i) Predict the acceleration if discs with a total mass of 800 g are used.

**(1)**

acceleration = ........................................................ m/s$^2$

(ii) There are frictional forces in the system.

Identify a feature of the graph that shows there are frictional forces in the system.

**(1)**

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(iii) Explain how the investigation could be developed to remove the effects of friction.

**(2)**

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**(Total for question = 4 marks)**