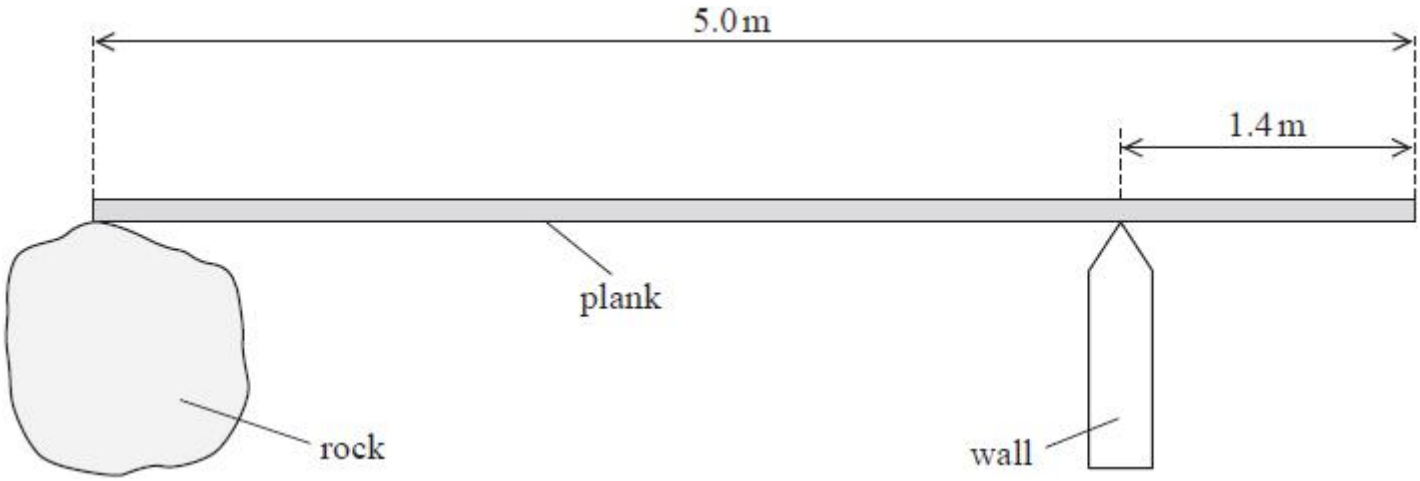
Practice Question Set For A-Level
Subject : Physics
Paper-1 Topic : 2 (Mechanics)

Merit Minds
www.merit-minds.com
Exam Preparation and Free Resources

Name of the Student:_____
Max. Marks : 23 Marks **Time : 23 Minutes**

Q1.

Some students used a plank to make a bridge to cross a stream. The plank rested on a rock and a wall as shown. Assume the plank is uniform.



A student of weight 550 N states that the plank will tip if she walks from the rock to the other end of the plank. Justify the student's statement.

(3)

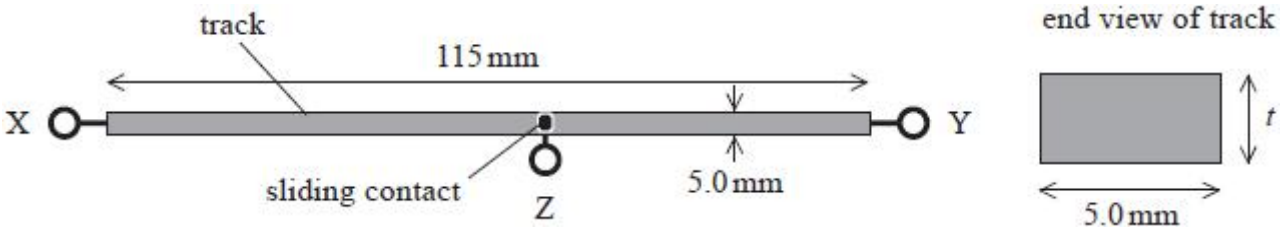
.....
.....
.....
.....
.....
.....

(Total for question = 3 marks)

Q2.

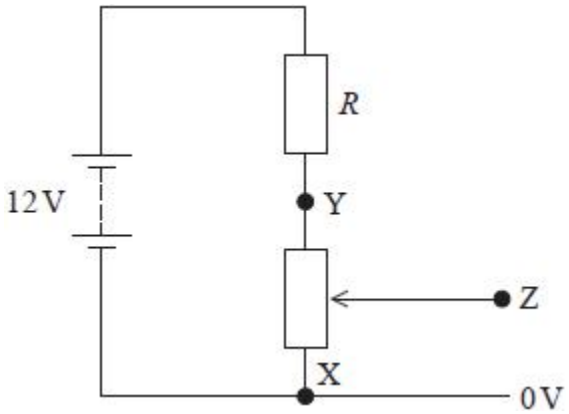
A potential divider circuit may contain a component known as a potentiometer. One type of potentiometer consists of a track with terminals X and Y at either end. There is a sliding contact that can move along the track connected to a terminal Z as shown.

Downloaded from www.merit-minds.com



The length of the track is 115 mm and the width is 5.0 mm.

The potentiometer is used to monitor the displacement of a moving tool on a machine in a production line. The tool is attached to the sliding contact. The potentiometer is connected to a resistor of resistance *R* and a potential difference is applied as shown. The tool moves through a maximum displacement of 60 mm from end X, producing a maximum potential difference of 5.0 V between Z and X.



(i) Show that the potential difference between X and Y is about 10 V.

(2)

.....

.....

.....

.....

(ii) Calculate the value of *R*.

(3)

.....

.....

.....

.....

.....

.....

R = ...

(iii) When the circuit is assembled, using the correctly calculated resistance value and a battery of e.m.f. 12 V, it is found that the maximum output from the potentiometer is slightly less than 5.0 V.

Explain why the maximum output is slightly less than predicted.

(3)

.....

.....

.....

.....

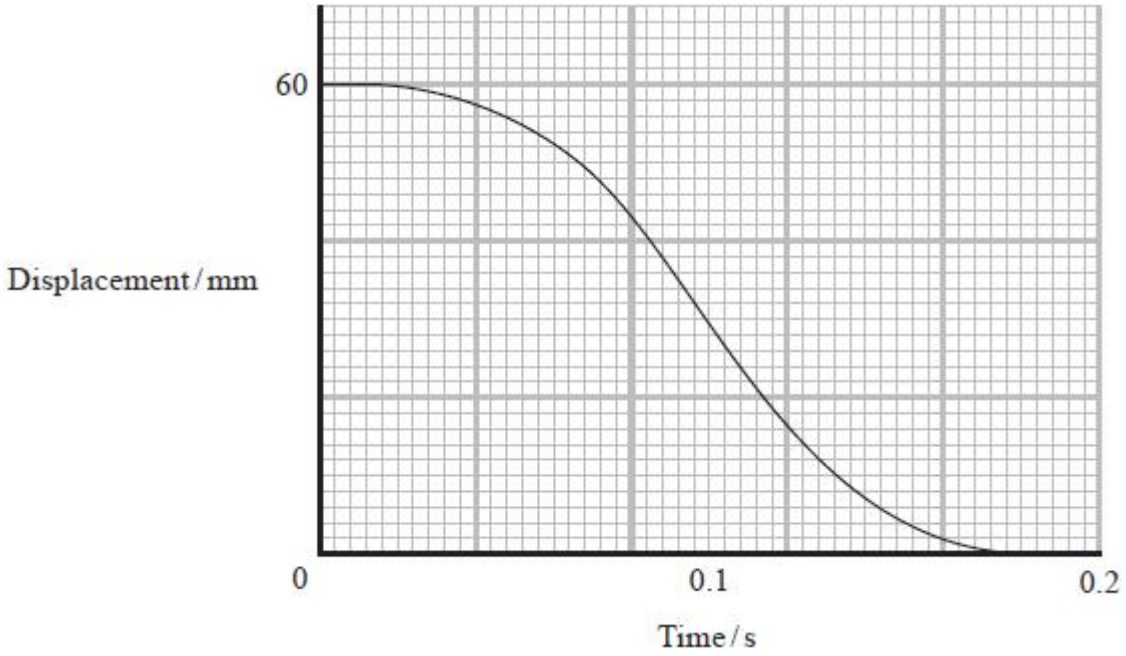
Downloaded from www.merit-minds.com

.....

.....

(iv) The tool on the machine should not travel with a speed any larger than 0.8 m s^{-1} .

The graph shows how the displacement varies with time for the downward stroke of the moving tool.



Deduce whether this speed is exceeded by the moving tool.

(4)

.....

.....

.....

.....

.....

.....

.....

.....

.....

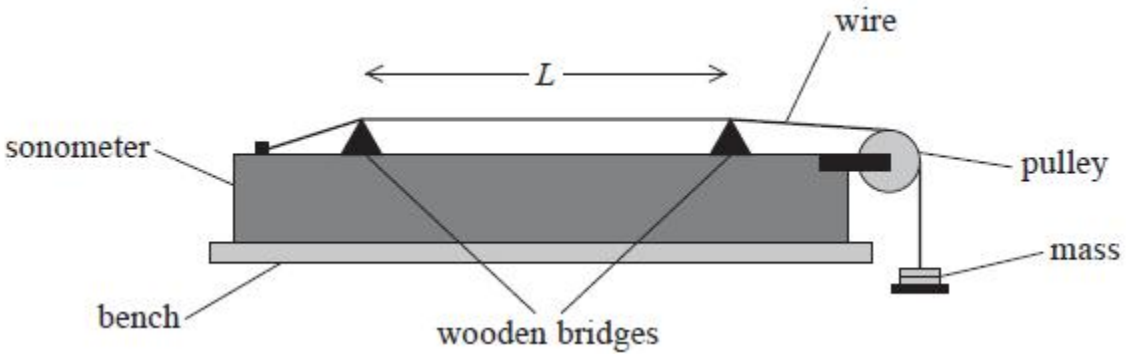
(Total for question = 12 marks)

Q3.

A student used a sonometer to investigate the properties of a stretched wire. The sonometer is a long hollow wooden box.

A steel wire is attached to one end of the box and rests on two wooden bridges. The wire is placed under tension *T* by hanging a mass from the end of the wire, as shown.

Downloaded from www.merit-minds.com



The student placed the base of a vibrating tuning fork in contact with the wire, at one of the bridges. This set the wire into oscillation. He adjusted the position of the other bridge until a single-loop standing wave was produced on the wire between the bridges.

The student repeated this for a series of tuning forks with different frequencies *f*. For each fork he measured the distance *L* between the bridges.

The steel wire, of mass per unit length μ, was placed under tension *T* by hanging a mass of 2.10 kg from the end of the wire.

(i) State one safety precaution that should be taken when carrying out the investigation.

(1)

.....

(ii) The student plotted a graph of L^2 against $1/f^2$.

Show that the gradient of this graph is equal to $\frac{T}{4\mu}$

(3)

.....

.....

.....

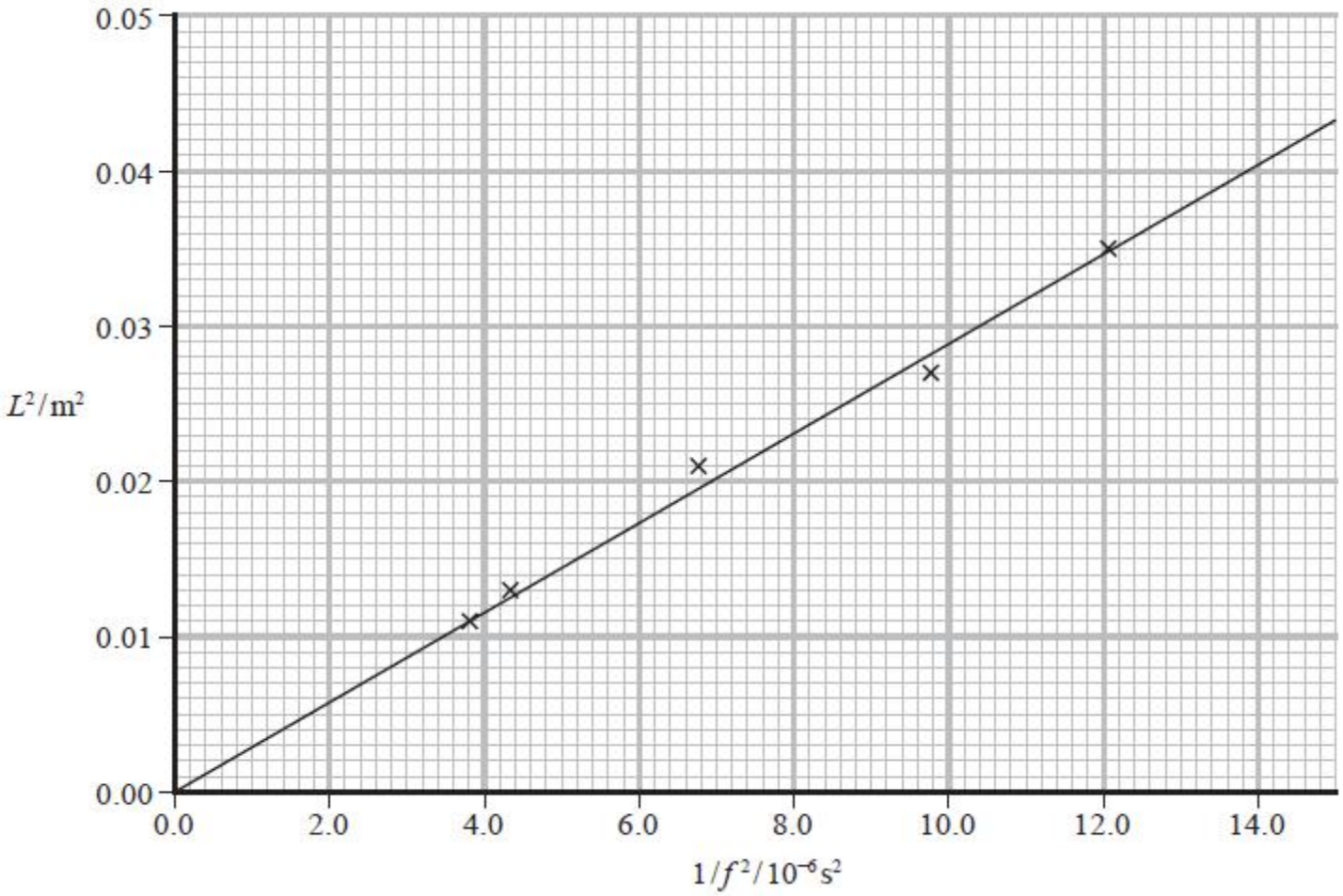
.....

.....

.....

(iii) The student's graph is shown below.

Downloaded from www.merit-minds.com



The value of μ for different standard wire gauge (SWG) steel wire is shown in the table.

SWG	μ / g m^{-1}
22	3.15
24	1.95
26	1.31

Deduce which wire the student used in the investigation.

(4)

.....

.....

.....

.....

.....

.....

(Total for question = 8 marks)

Downloaded from www.merit-minds.com