

Practice Question Set For A-Level
Subject : Physics
Paper-1 Topic : 3_ElectricCircuits

Name of the Student: _____

Max. Marks : 18 Marks

Time : 18 Minutes

Q1.

A student is asked to determine the resistivity of a metal in the form of a wire using a graphical method.

(a) Draw a circuit diagram of the circuit he should use and state any additional equipment that would be required.

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(b) Describe how the measurements obtained could be used to determine a value for the resistivity of the metal.

(5)

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(c) State **one** precaution that the student should take to ensure the results are as accurate as possible.

(1)

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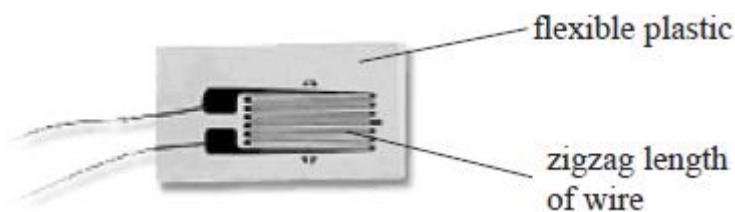
(Total for question = 9 marks)

Q2.

A medical scanner uses a moving table to position the patient. Strain gauges are used to monitor the shape of the table which enables a more precise positioning of the patient.



Strain gauges consist of a thin length of wire attached, in a zigzag pattern, to a small flexible piece of plastic. The strain gauge is attached to the table. When the table is subjected to forces, the dimensions of the plastic change. This causes a change in the length of the wire and hence a change in the resistance of the wire.



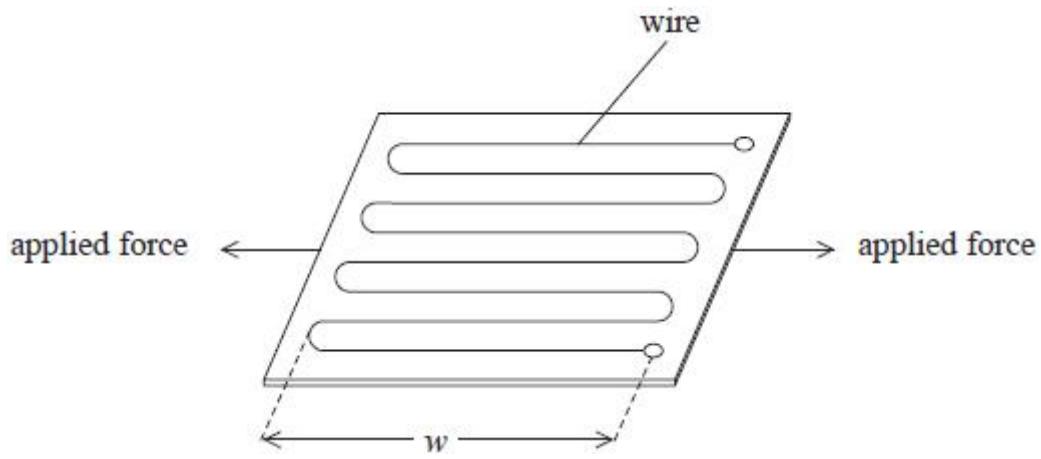
(a) Resistance can be measured directly using an ohmmeter or indirectly using measurements from a voltmeter and ammeter.

Describe **two** benefits of using an ohmmeter compared to using a voltmeter and an ammeter.

(2)

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(b) The diagram shows forces applied to a strain gauge. The 'width' of the strain gauge is defined by the distance w .



(i) State and justify how the applied forces change the resistance of the wire.

(2)

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(ii) The gauge factor GF of a strain gauge is given by

$$GF = \frac{\Delta R}{\epsilon R}$$

where ϵ is the strain

R is the initial resistance

ΔR is the change in resistance

When forces are applied to the strain gauge, the resistance of the gauge changes by 0.10%.

Calculate the change in the width of the strain gauge.

$w = 5.0$ cm

$GF = 2.0$

(3)

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Change in width =

(c) Explain the benefit of arranging the wire in a zigzag pattern.

(2)

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(Total for question = 9 marks)