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

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Name of the Student:_____
Max. Marks : 15 Marks **Time : 15 Minutes**

Q1.

Columns **A and B** show some of the results from an experiment in which the current *I* through a component X was measured for various values of the potential difference *V* applied across it.

column A	column B	column C	column D
potential difference *V* / V	current *I*/ mA	(*V* – 0.55) / V	ln (*I* / mA)
0.70	12.5		
0.75	17.0		
0.80	22.0		
0.85	29.0		
0.90	39.0		
0.95	51.5		

(a) Draw a diagram of a circuit which could have been used to obtain these results.

(2)

(b) (i) Calculate the resistance of X when the potential difference is 0.70 V.

_____

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(ii) By considering **one** other value of potential difference, explain whether or not X is an ohmic conductor.

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(3)

(c) It is suggested that for potential differences greater than 0.55 V, the current voltage relationship for X is of the form.

$I = A\ e^{k(V-0.55)}$

where A and k are constants.

(i) Complete **column C** and **column D** in the table above

(ii) Plot a graph of 1n (I /mA) on the y-axis against (V – 0.55) on the x-axis.

(Allow one sheet of graph paper)

(iii) Use your graph to determine the constants k and A.

(iv) On the basis of your graph, discuss the validity of the above relationship.

(10)

(Total 15 marks)

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