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

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Name of the Student:_____
Max. Marks : 24 Marks **Time :** 24 **Minutes**

Q1.

An electric oven is connected to a 230 V root mean square (rms) mains supply using a cable of negligible resistance.

(a) (i) Calculate the peak-to-peak voltage of the mains supply.

peak-to-peak voltage = _____ V

(2)

(ii) The resistance of the heating element in the oven at its working temperature is 12 Ω.

Calculate the power dissipated by the heating element in the oven.
Give your answer to an appropriate number of significant figures.

power = _____ W

(3)

(b) In practice the resistance of the cable connecting the oven to the mains supply is not negligible. Each of the **two** wires connecting the heating element to the mains electricity supply has a length of 3.15 m. Each metre of wire has a resistance of 0.0150 Ω.

(i) Explain why the rms voltage across the heating element in the oven will be less than 230 V.

_____

_____

_____

_____

(2)

(ii) Calculate the rms voltage across the heating element in the oven when it is at its working temperature.

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rms voltage = _____ V

(3)

(iii) Calculate the average power wasted in the cable due to the heating effect of the electric current.

average power = _____ W

(2)

(iv) State **two** reasons why it is important that the cable has a low resistance.

1. _____

_____

_____

2. _____

_____

_____

(2)

(Total 14 marks)

Q2.

Figure 1 shows a circuit that includes an oscilloscope used to find the internal resistance *r* of a battery.

Figure 1

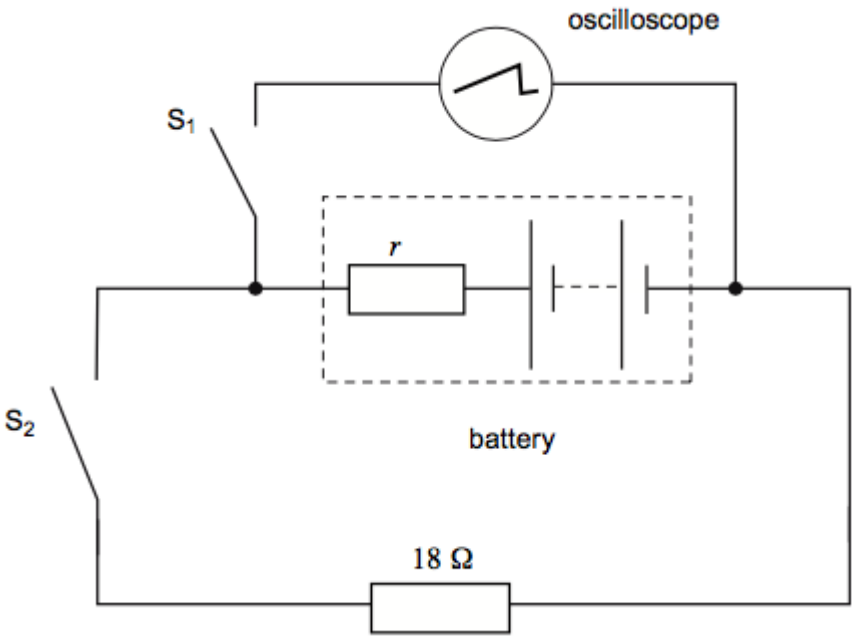

Figure 2 represents the screen of the oscilloscope. With switches S_1 and S_2 open, a bright spot is

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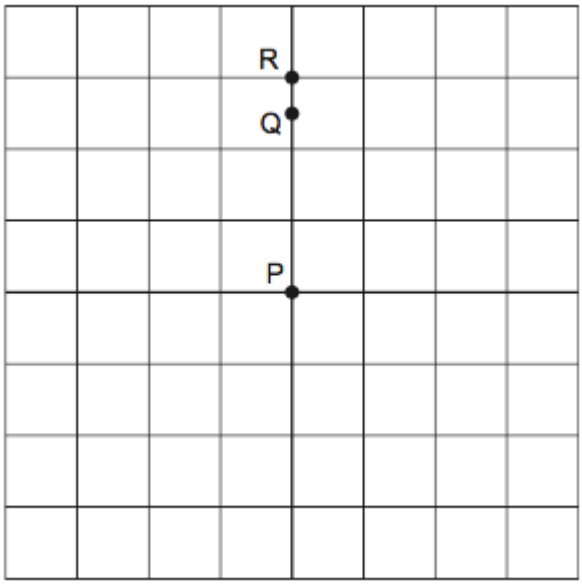
seen on the screen at P.

Figure 2



The vertical sensitivity of the oscilloscope is set at 2.0 V per division.

(a) Explain why the oscilloscope shows a bright spot rather than a horizontal line.

_____

_____

(1)

(b) When switch S_1 is closed, the spot moves to R.

(i) State the electrical property of the battery represented by the deflection PR.

_____

_____

(1)

(ii) Determine the value of the electrical quantity represented by the deflection PR.

electrical quantity = _____

(1)

(c) With switch S_1 kept closed, switch S_2 is also closed. The spot moves to Q.

Explain why the spot moves from R to Q.

_____

_____

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_____

_____

_____

(3)

(d) Calculate the current in the battery when both switches are closed.

current = _____ A

(2)

(e) Calculate the internal resistance of the battery.

internal resistance = _____ Ω

(2)

(Total 10 marks)

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