

Name of the Student: _____

Max. Marks : 19 Marks

Time : 19 Minutes

Q1.

A car headlamp has a power rating of 55 W when the current in the headlamp is 4.4 A.

(i) State the equation relating power, current and resistance.

(1)

(ii) Calculate the resistance of the headlamp.

(3)

resistance = Ω

(Total for question = 4 marks)

Q2.

Figure 16 shows a cardboard tube with a wire coming out from each end.



Figure 16

There are two 10 ohm resistors inside the cardboard tube.

A potential difference of 6.0 V is connected between P and Q.

There is a current of 1.2 A in the wires.

Deduce how the resistors have been arranged inside the cardboard tube.

(3)

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(Total for question = 3 marks)

Q3.

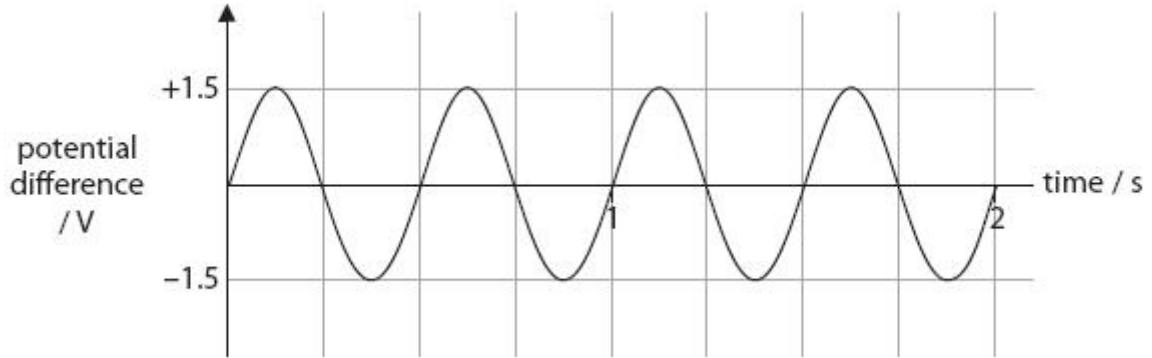
(a) What is the name of the device used to change the size of an alternating voltage?

(1)

(b) A light emitting diode (LED) can only emit light when connected correctly to a potential difference.



Use this information to suggest what happens when this alternating voltage is connected across the LED.



(c) A LED lamp has a power rating of 3 W.
The voltage across the lamp is 12 V.
Calculate the current in the lamp.

(3)

current in the lamp =A

*(d) Some research has been carried out into replacing fluorescent lamp fittings with LED fittings.



photo of stairwell with fluorescent fitting



photo of stairwell with LED fitting

The data in the table is taken from the report of a trial using LEDs to light stairwells and corridors in a large building.

total energy saved each year by using LEDs	3 000 kW h
LED fitting cost	£2 000
CO ₂ saving each year by using LEDs	1.6 tonnes
change in lighting levels by using LEDs	200%
average price of electrical energy	14 p / kW h
average lifetime of LED fittings	50 000 hours
average lifetime of fluorescent fittings	10 000 hours

Use the information to discuss the benefits of replacing fluorescent fittings with LED fittings.

(6)

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(Total for Question = 12 marks)