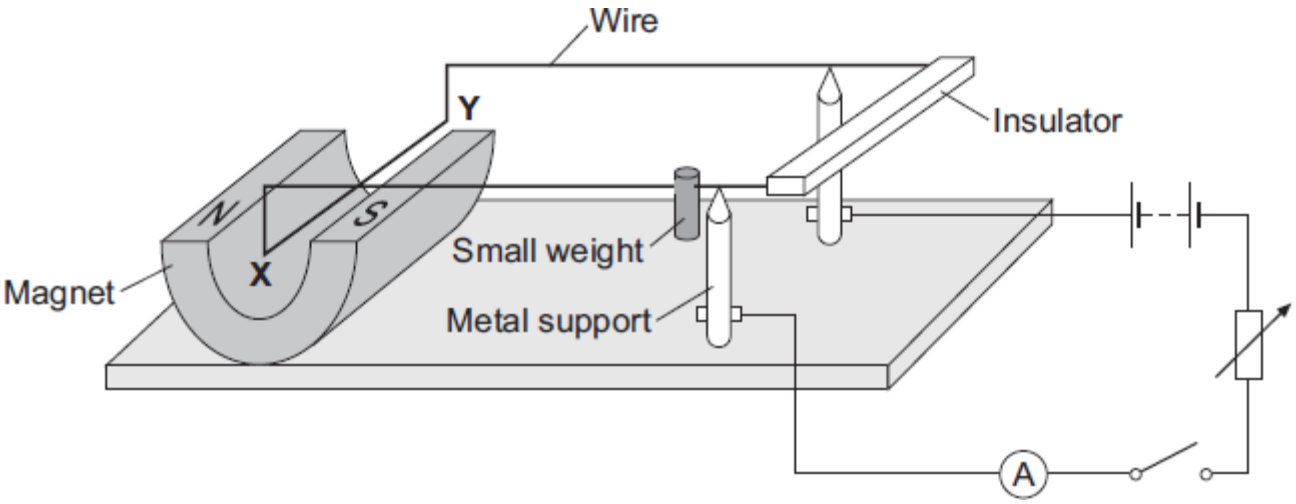
Name of the Student:_____
Max. Marks : 22 Marks **Time : 22 Minutes**

Q1.

The diagram shows a device called a current balance.



(a) (i) When the switch is closed, the part of the wire labelled **XY** moves upwards.

Explain why.

_____

_____

_____

_____

(2)

(ii) What is the name of the effect that causes the wire **XY** to move?

_____

(1)

(iii) An alternating current (a.c.) is a current which reverses direction. How many times the current reverses direction in one second depends on the frequency of the alternating supply.

Describe the effect on the wire **XY** if the battery is replaced by an a.c. supply having a frequency of 5 hertz.

_____

_____

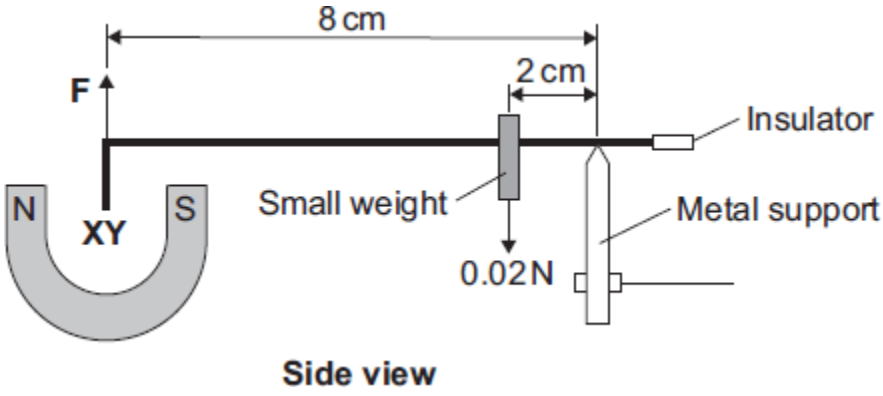
Downloaded from www.merit-minds.com

_____

_____

(2)

(b) The diagram shows how a small weight can be used to make the wire **XY** balance horizontally.



Side view

Use the data in the diagram and the equation in the box to calculate the force, **F**, acting on the wire **XY**.

moment	=	force	×	perpendicular distance from the line of action of the force to the axis of rotation

Show clearly how you work out your answer.

_____

_____

_____

_____

Force = _____ N

(3)

(Total 8 marks)

Q2.

(a) In the National Grid, very large step-up transformers link power stations to the transmission cables.

A transformer used for this purpose has 800 turns on its primary coil and 12 800 turns on its secondary coil. The p.d. (potential difference) across its primary coil is 25 kV.

Use the equation in the box to calculate the p.d. across its secondary coil.

$$\frac{\text{p.d. across primary}}{\text{p.d. across secondary}} = \frac{\text{number of turns on primary}}{\text{number of turns on secondary}}$$

Show clearly how you work out your answer **and** give the unit.

_____

Downloaded from www.merit-minds.com

_____

p.d. across secondary coil = _____

(3)

(b) The primary and secondary coils of a transformer are made of insulated wire.

Why is this insulation necessary?

_____

_____

(1)

(c) Describe what happens when an alternating potential difference is applied across the primary coil of a transformer.

_____

_____

_____

_____

_____

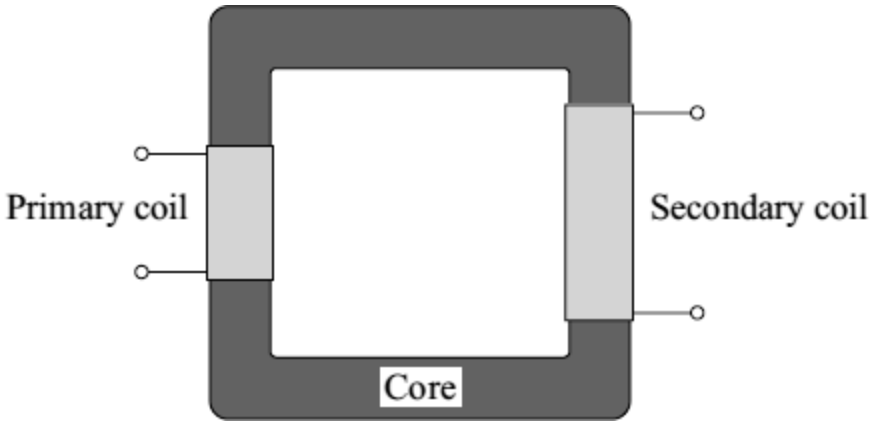
_____

(3)

(Total 7 marks)

Q3.

(a) The diagram shows the basic structure of a step-up transformer.



(i) What is the core made of?

_____

(1)

(ii) Explain how an alternating input produces an alternating output.

_____

_____

Downloaded from www.merit-minds.com

_____

_____

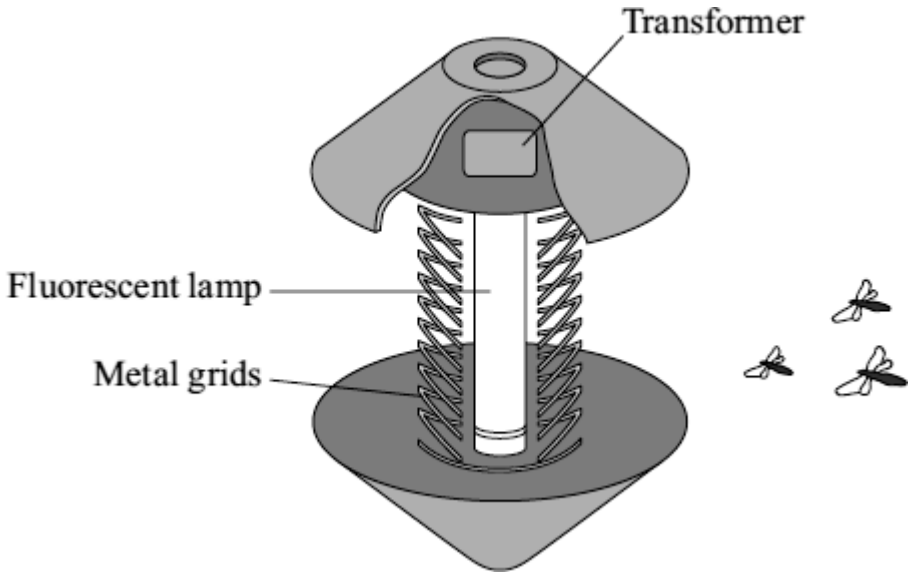
_____

_____

(3)

(b) Fly killers are used in kitchens and food stores because flying insects carry diseases which cause food poisoning.

The diagram shows the inside of one design. Insects are attracted to a fluorescent lamp. The metal grids have a high potential difference (p.d.) between them. The insects are killed as they fly between the grids.



A transformer is used in the fly killer. There is a p.d. of 230 V across the primary coil. There are 300 turns of wire on the primary coil and 4000 turns on the secondary coil.

Use the equation in the box to calculate the p.d. across the secondary coil.

$$\frac{\text{p.d. across primary}}{\text{p.d. across secondary}} = \frac{\text{number of turns on primary}}{\text{number of turns on secondary}}$$

Show clearly how you work out your answer.

_____

_____

_____

_____

_____

Potential difference = _____ V

(3)

(Total 7 marks)

Downloaded from www.merit-minds.com