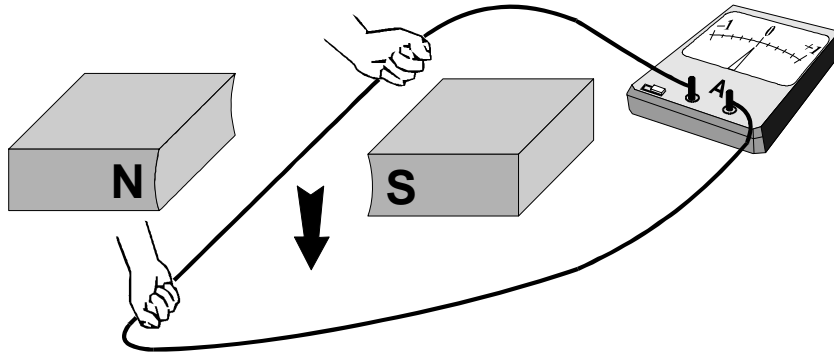


Keeping things moving

1. (a) The diagram shows one way of demonstrating a particular electrical effect.



As the wire is moved downwards between the poles of the magnet the ammeter needle swings to the right.

(i) What name is given to this electrical effect?

..... (1)

(ii) What happens to the ammeter needle when the wire is moved upwards between the poles of the magnet?

..... (1)

(iii) When the wire is held stationary between the poles of the magnet the ammeter needle does not move. Explain why.

.....

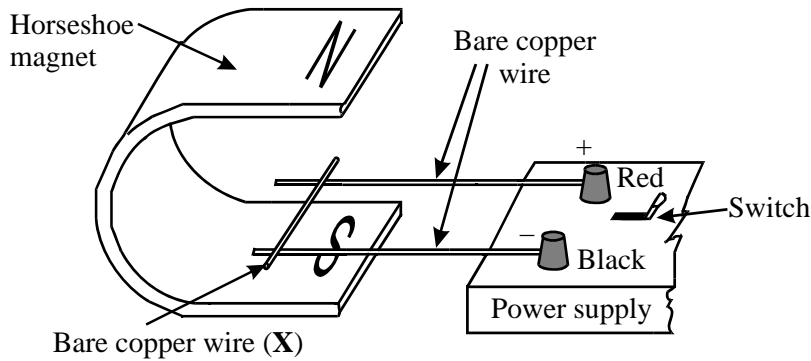
 (2)

(b) Complete the following sketch graph to show one complete cycle of an alternating current.



(1)
 (Total 5 marks)

2. The diagram shows apparatus used to demonstrate the motor effect. X is a short length of bare copper wire resting on two other wires.



- (a) (i) Describe what happens to wire X when the current is switched on.

.....

- (ii) What difference do you notice if the following changes are made?

A The magnetic field is reversed.

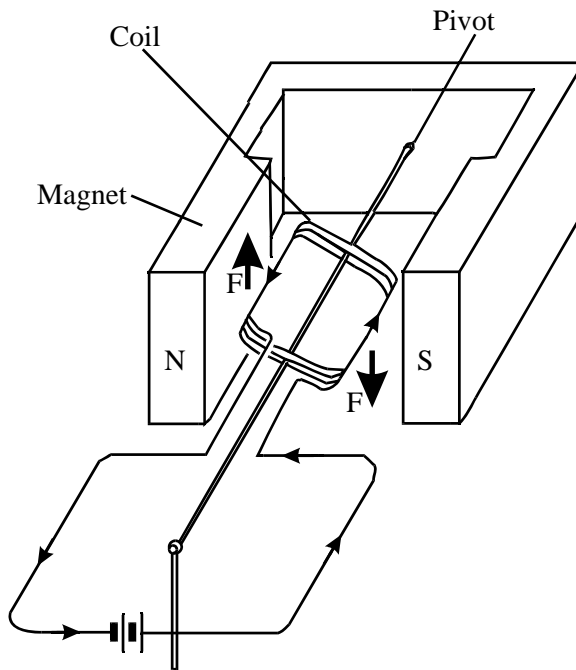
.....

B The current is increased.

.....

(3)

- (b) The diagram shows a coil placed between the poles of a magnet. The arrows on the sides of the coil itself show the direction of the conventional current.



The arrows labelled **F** show the direction of the forces acting on the sides of the coil. Describe the motion of the coil until it comes to rest.

.....

.....

.....

(3)

- (c) Most electric motors use electromagnets instead of permanent magnets. State three of the features of an electromagnet which control the strength of the magnetic field obtained.

1

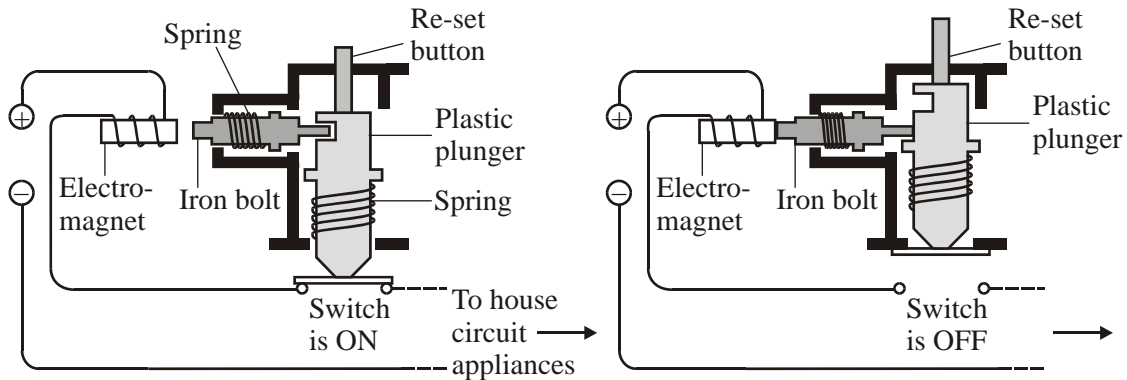
2

3

(3)

(Total 9 marks)

3. Circuit breakers help to make the electricity supply in homes safer. A circuit breaker is an automatic safety switch. It cuts off the current if it gets too big.



Describe, in as much detail as you can, how this circuit breaker works.

To gain full marks in this question you should write your ideas in good English. Put them into a sensible order and use the correct scientific words.

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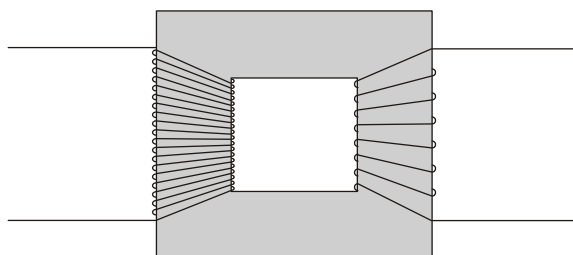
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(Total 6 marks)

4. (a) The basic structure of a transformer is a primary coil of insulated wire, an iron core and a secondary coil of insulated wire.



- (i) Why is the core made of iron?

.....

.....

(1)

(ii) Explain how a transformer works.

.....
.....
.....
.....
.....
.....
.....
.....

(4)

(b) A small step-down transformer is used in the charger for an electric screwdriver.

The input to the transformer is 230 V a.c. mains supply and the output is 5.75 V a.c. There are 3200 turns on the primary coil.

Use the equation in the box to calculate the number of turns on the transformer's 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.

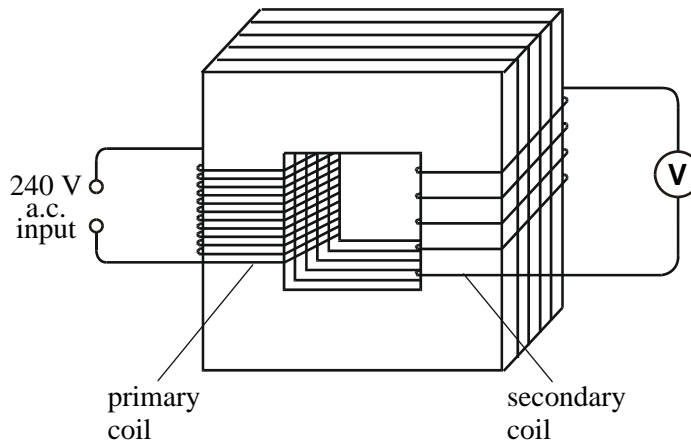
.....
.....

Number of turns =

(2)

(Total 7 marks)

5. The diagram below shows a transformer.



(i) Name the material used to make the core of the transformer.

..... (1)

(ii) The primary coil has 48 000 turns and the secondary coil 4000 turns. If the input voltage is 240 V a.c., calculate the output voltage.

.....

 Answer V

(2)

(iii) Explain how the use of such a transformer could be adapted to transform a low voltage into a higher voltage.

.....

(1)

(Total 4 marks)