Electromagnetic Induction – 2022 November IGCSE 0625

1. Nov/2022/Paper_11/No.34

An observer stands at the finish line of a 100 m race. He wants to time the winner's run. He starts his stop-watch as soon as he sees the smoke from the starting gun instead of when he hears the bang.

What is the reason for doing this?

A Light travels much faster than sound.

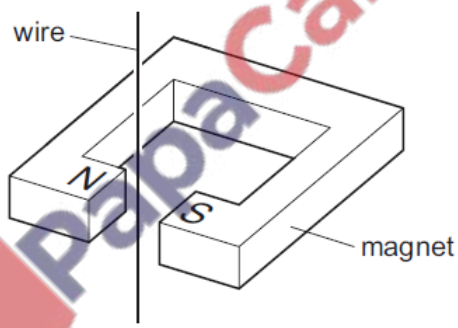
B There is a risk he might respond to an echo from a wall.

C Humans react slower to sound than to light.

D Humans react more quickly to sound than to light.

2. Nov/2022/Paper_11/No.36

A wire is placed between the poles of a magnet.



Which statements are correct?

1 An a.c. current in the wire causes a changing force on it.

2 A downward d.c. current in the wire causes a constant force on it.

3 An upward d.c. current in the wire causes a constant force on it.

A 1 and 2 only **B** 1 and 3 only **C** 2 and 3 only **D** 1, 2 and 3

3. Nov/2022/Paper_12/No.35

Transformers are used in the transmission of electrical power to houses.

Which type of transformer is used at the power station prior to connection to the power lines and which type is used prior to delivery to the houses?

	power station	before houses
A	step-down	step-down
B	step-down	step-up
C	step-up	step-down
D	step-up	step-up

4. Nov/2022/Paper_12/No.36

The diagrams show the coils of two simple direct current (d.c.) motors. Coil P has three turns of wire and coil Q has two turns. Coil P has the same dimensions as coil Q. The coils are in identical magnet fields.

What produces the greatest turning effect?

	coil	current / A
A	P	2
B	P	4
C	Q	2
D	Q	4

5. Nov/2022/Paper_13/No.35

Which metal is used for the core of a transformer?

A aluminium

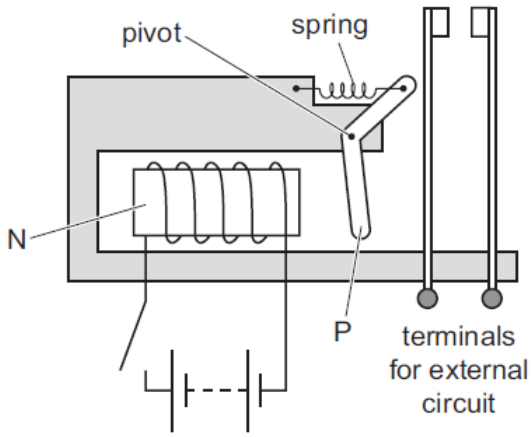
B copper

C soft iron

D steel

6. Nov/2022/Paper_13/No.36

The diagram shows the design of a type of relay.



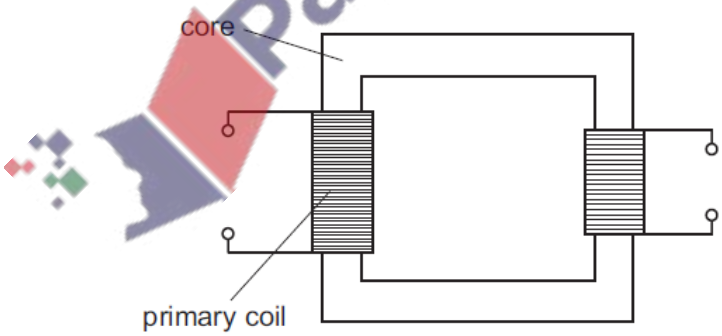
Two parts are labelled N and P.

From which metal is N made and from which metal is P made?

	N	P
A	soft iron	soft iron
B	soft iron	steel
C	steel	soft iron
D	steel	steel

7. Nov/2022/Paper_21/No.34

The diagram represents a transformer.



Which row shows materials suitable for making the core and the primary coil?

	core	primary coil
A	iron	copper
B	iron	plastic
C	steel	copper
D	steel	plastic

8. Nov/2022/Paper_21/No.35

Which statement about electromagnetic induction is correct?

A A conductor moving parallel to magnetic field lines induces an electromotive force (e.m.f.) in the conductor.

B The direction of the induced electromotive force (e.m.f.) opposes the change which produces it.

C The induced current is in a direction parallel to the direction of motion producing it.

D The induced electromotive force (e.m.f.) decreases when the speed of the conductor moving across the field lines increases.

9. Nov/2022/Paper_22/No.35

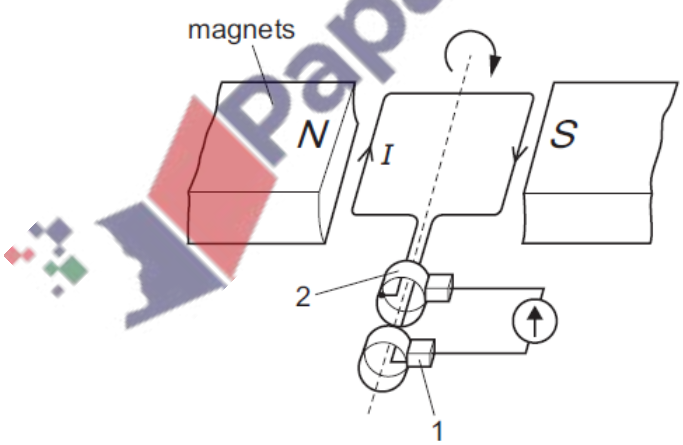
Transformers are used in the transmission of electrical power to houses.

Which type of transformer is used at the power station prior to connection to the power lines and which type is used prior to delivery to the houses?

	power station	before houses
A	step-down	step-down
B	step-down	step-up
C	step-up	step-down
D	step-up	step-up

10. Nov/2022/Paper_22/No.36

The diagram shows an a.c. generator rotating in a clockwise direction.



What are the names of parts 1 and 2?

	1	2
A	brush	slip-ring
B	brush	split-ring commutator
C	slip-ring	brush
D	slip-ring	split-ring commutator

11. Nov/2022/Paper_23/No.35

Which metal is used for the core of a transformer?

A aluminium

B copper

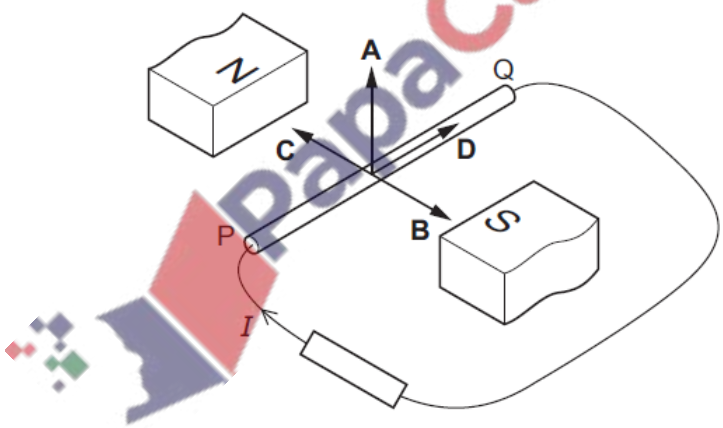
C soft iron

D steel

12. Nov/2022/Paper_23/No.36

The diagram shows a conducting metal rod PQ in the magnetic field between the N pole and the S pole. The rod is connected to a resistor in a circuit.

In which direction should rod PQ be moved to induce the current I in the direction of the arrow in the circuit?



13. Nov/2022/Paper_31/No.9

Fig. 9.1 shows a transformer used on a building site.

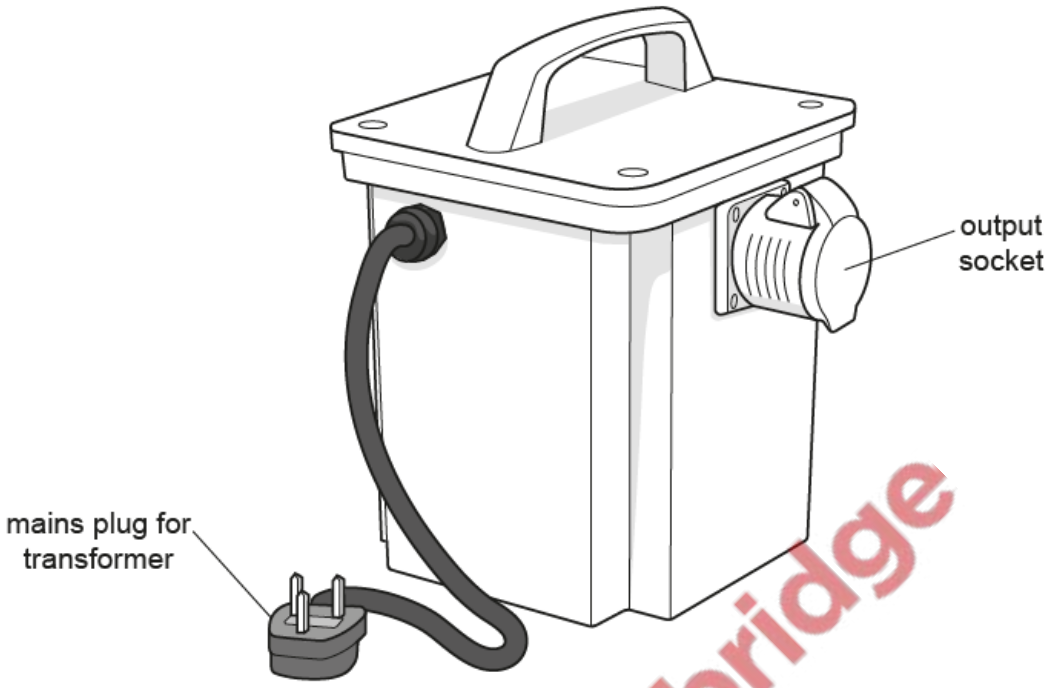


Fig. 9.1

(a) The mains plug for the transformer contains a fuse.

(i) Give a reason why the plug includes a fuse.

..... [1]

(ii) Explain how a fuse works.

.....

..... [2]

(b) The mains input (primary) potential difference (p.d.) to the transformer is 230 V a.c.

The number of turns on the input (primary) coil is 314. The number of turns on the output (secondary) coil is 150.

Calculate the output (secondary) p.d. from the transformer.

output p.d. = ... V [3]

(c) Fig. 9.2 shows an outline of the transformer.

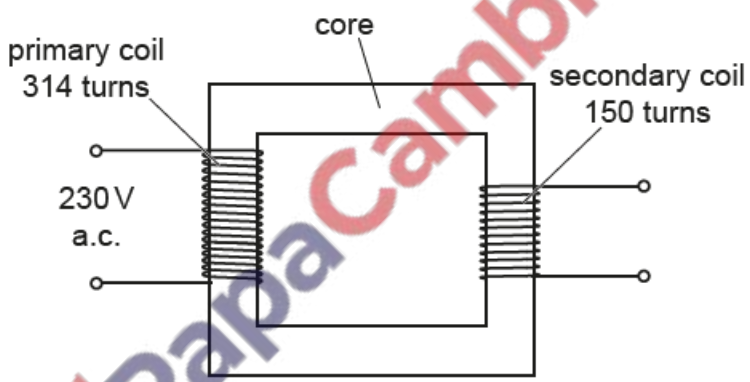


Fig. 9.2

(i) State a suitable material for the core of the transformer.

..... [1]

(ii) State a suitable material for the primary and secondary coils of the transformer.

..... [1]

(iii) Explain how Fig. 9.2 shows a step-down transformer.

..... [1]

[Total: 9]

14. Nov/2022/Paper_32/No.9(a_ c)

Fig. 9.1 shows a transformer. An a.c. voltmeter is connected to the output of the secondary coil.

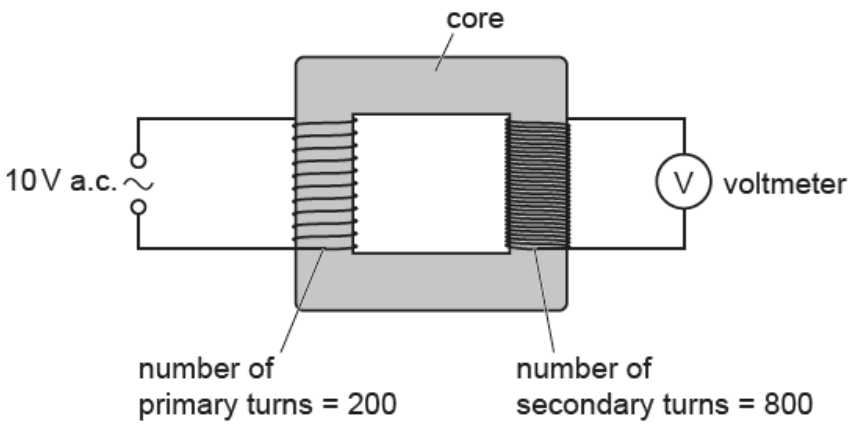


Fig. 9.1

(a) State the meaning of a.c.

..... [1]

(b) State the name of the type of transformer shown.

..... [1]

(c) State a suitable material for the core of the transformer in Fig. 9.1.

..... [1]

15. Nov/2022/Paper_32/No.10

(a) Fig. 10.1 shows the equipment used by a teacher in a laboratory demonstration.

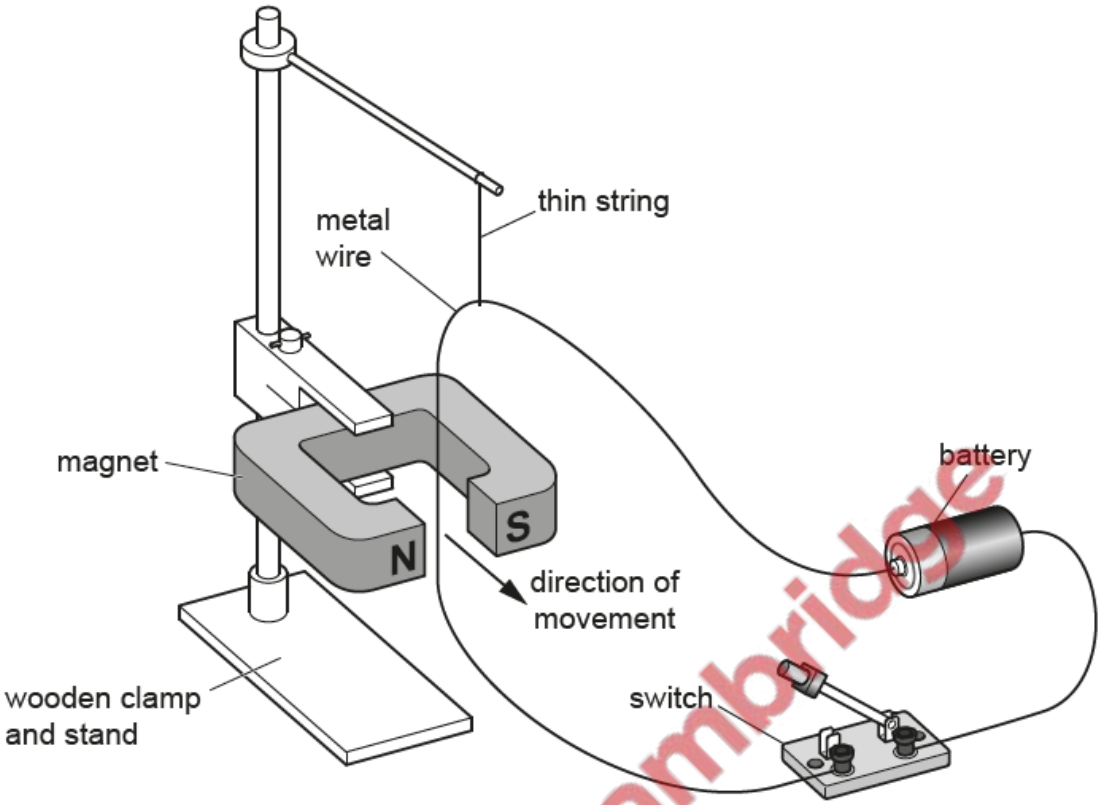


Fig. 10.1

The teacher closes the switch and there is a current in the metal wire.
A force acts on the wire. The wire moves in the direction shown in Fig. 10.1.

(i) State **two** changes that increase the force on the wire.

1. ..... [1]

2. ..... [1]

(ii) State **one** change that reverses the direction of the force on the wire.

..... [1]

(b) Fig. 10.2 shows the poles of the magnet.

Draw the shape and show the direction of the magnetic field in the gap between the poles of the magnet.

Fig. 10.2

[2]

[Total: 5]

16. Nov/2022/Paper_41/No.7

The electric starter motor in a car is switched on and off using a relay.

The relay consists of a plastic case and two flexible springy strips, X and Y, which are made of soft iron. These iron strips act as the switch when a circuit is connected between the terminals W and Z.

Fig. 7.1 shows X, Y and the plastic case.

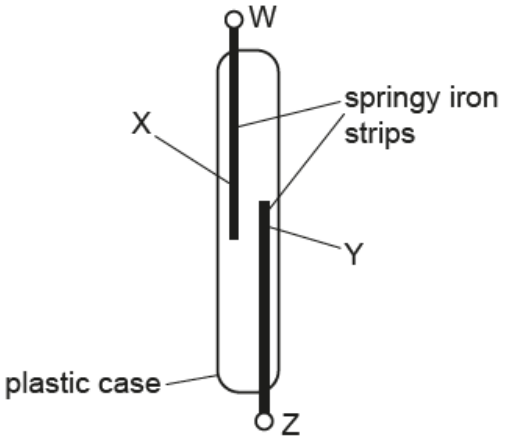


Fig. 7.1

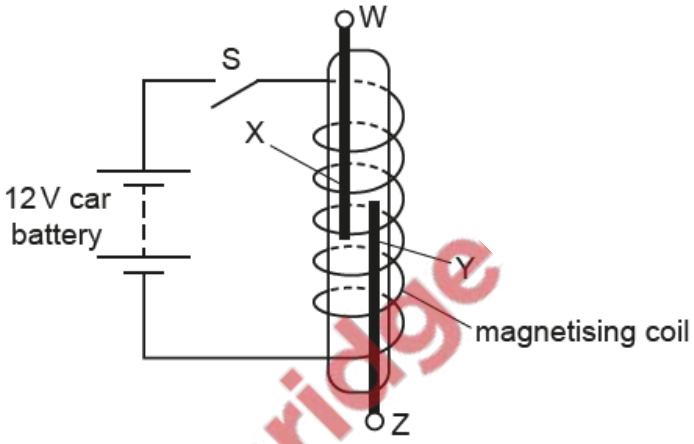


Fig. 7.2

Fig. 7.2 shows the equipment from Fig. 7.1 inside a magnetising coil. The magnetising coil is in series with the 12 V car battery and switch S, which is open.

(a) Switch S is now closed.

Explain what happens to the springy iron strips X and Y.

.....

.....

.....

..... [3]

(b) The power of the starter motor is 1.8 kW and it is also operated by the car battery.

(i) Calculate the current in the starter motor when it is used.

current = ... [2]

(ii) The starter motor circuit is connected between terminals W and Z.

Explain why copper wires with a large cross-sectional area are used for this circuit.

.....

.....

..... [2]

(c) Fig. 7.3 shows the relay and the symbols for the car battery and the starter motor.

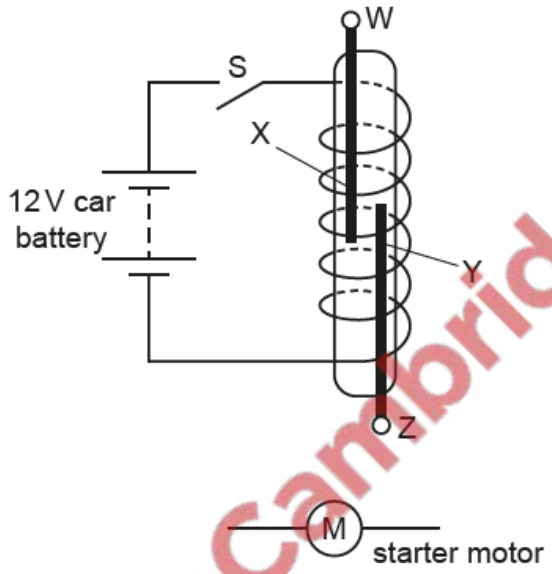


Fig. 7.3

The springy iron strips X and Y act as the switch for the starter motor circuit.

Complete the circuit diagram for the motor circuit. [2]

[Total: 9]

17. Nov/2022/Paper_43/No.9

Fig. 9.1 shows a circuit with an alternating current (a.c.) supply, a resistor and a diode.

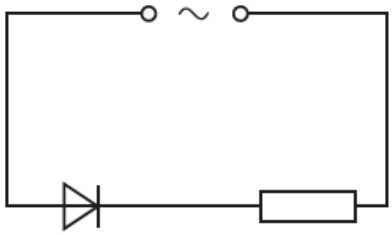


Fig. 9.1

The frequency of the power supply is 50 Hz.

(a) Calculate the time period (time for one complete cycle) of the a.c. supply.

time = ... [2]

(b) The peak potential difference (p.d.) across the resistor is 340 V.

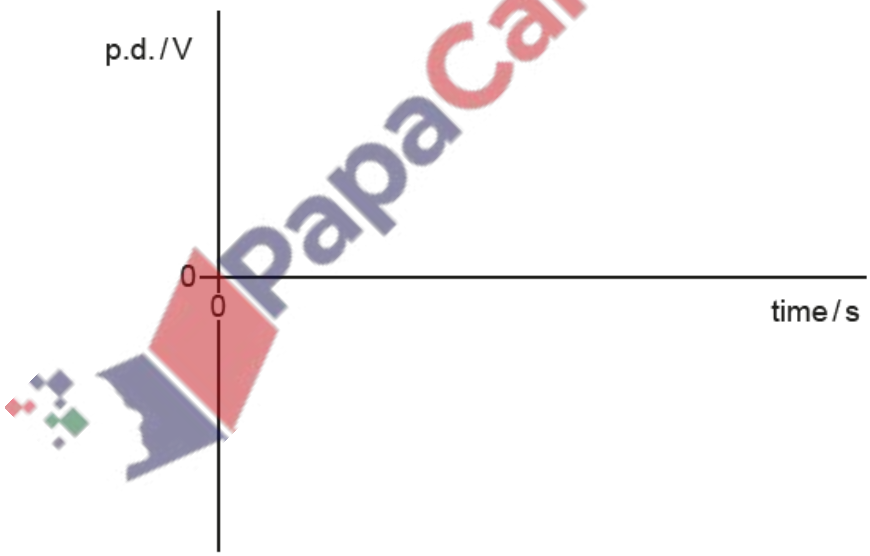


Fig. 9.2

On Fig. 9.2:

(i) sketch a graph to show how the p.d. across the resistor varies with time for two cycles [2]

(ii) label the p.d. axis with the value of p.d. at the peak [1]

(iii) label the time axis with two values of time. [2]

[Total: 7]