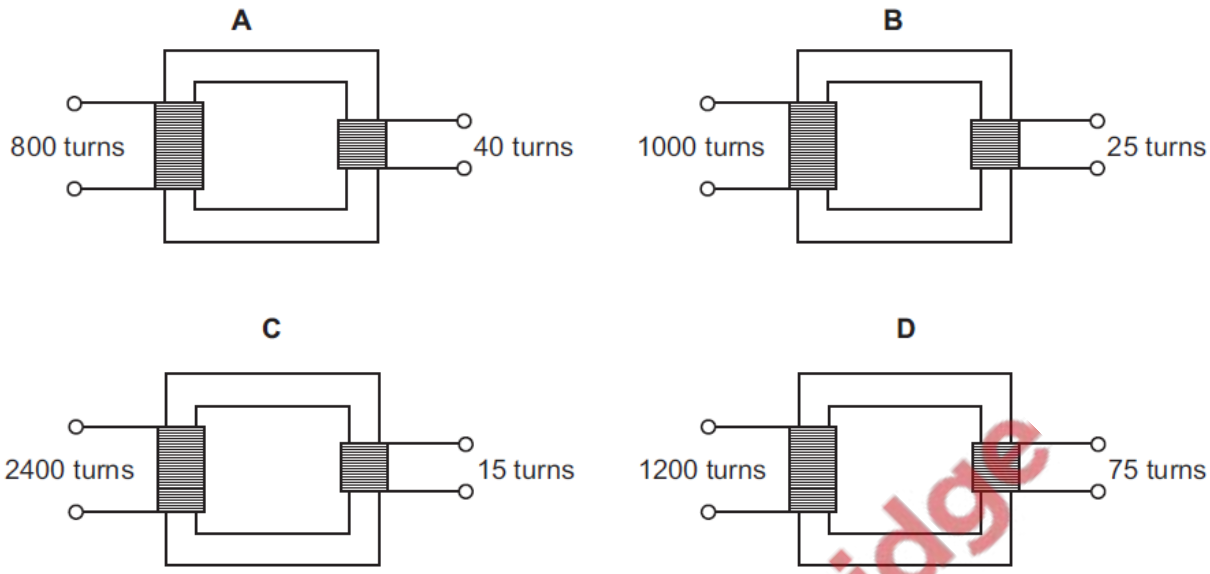
Electromagnetic Induction – 2022 June IGCSE 0625

1. June/2022/Paper_11/No.35

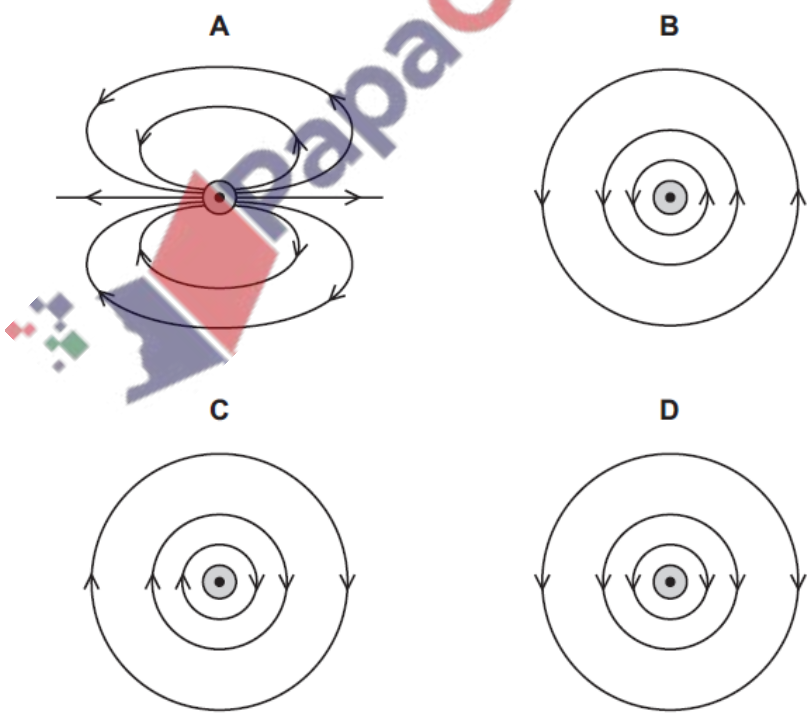
Which transformer can change a 240 V a.c. input into a 15 V a.c. output?



2. June/2022/Paper_11/No.36

The diagrams show patterns around a straight wire carrying a current perpendicularly out of the page.

Which pattern represents the magnetic field due to the current in the wire?



3. June/2022/Paper_11/No.37

A current-carrying coil in a magnetic field experiences a turning effect.

Three suggestions for increasing the turning effect are given.

1 Increase the number of turns on the coil.

2 Increase the current in the coil.

3 Increase the strength of the magnetic field.

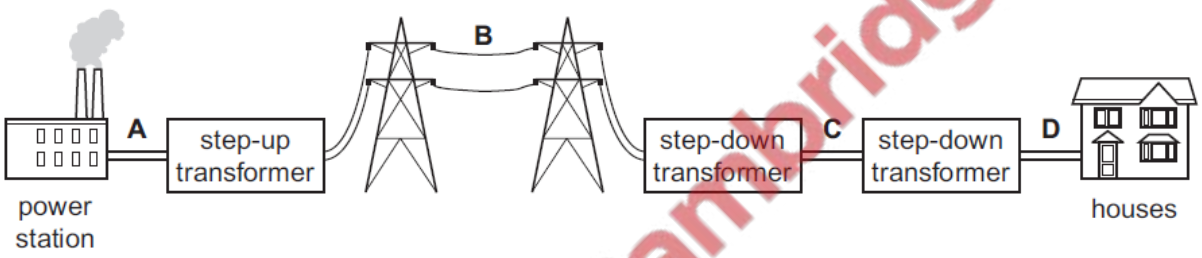
Which suggestions are correct?

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

4. June/2022/Paper_12/No.35

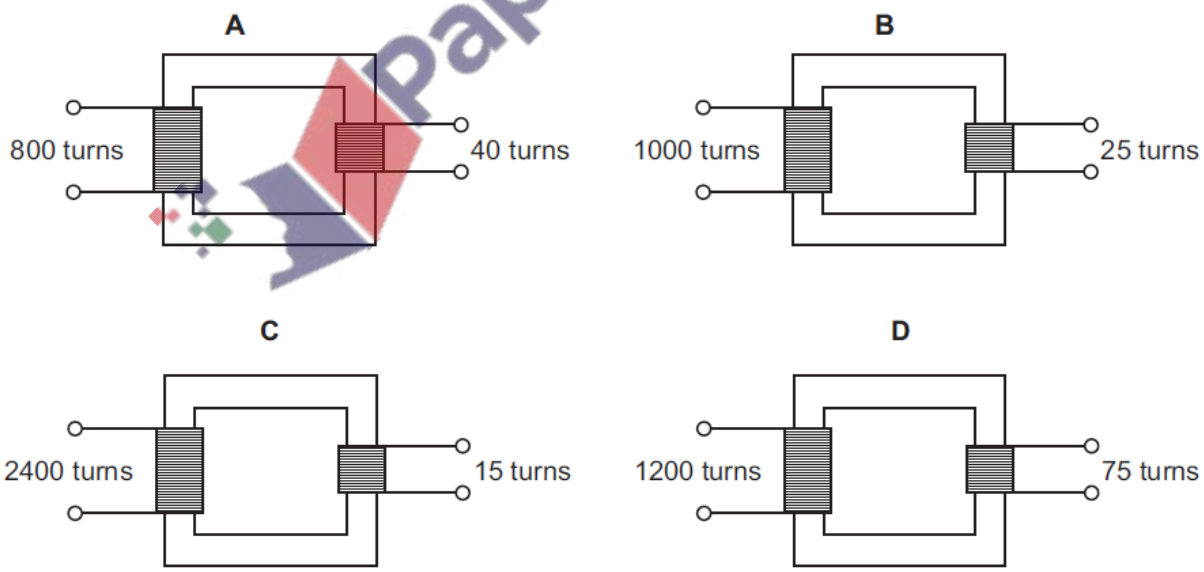
Electrical power is transmitted from power stations to homes using the National Grid.

In which part of the National Grid is the voltage highest?



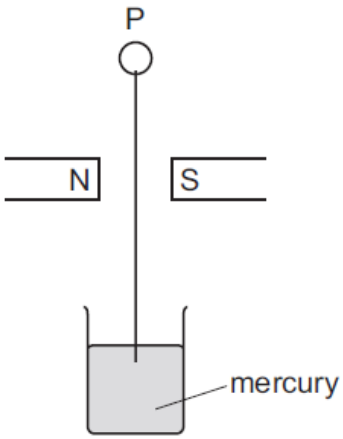
5. June/2022/Paper_12/No.36

Which transformer can change a 240 V a.c. input into a 15 V a.c. output?



6. June/2022/Paper_13/No.37

The diagram shows a wire hanging from a metal loop P and dipping into a bath of mercury.



The wire is hanging vertically between the N and S poles of a magnet.

The loop P is then connected to the positive terminal of a battery and the mercury is connected to the negative terminal.

The wire swings out of the page.

In which direction does the wire move when P is connected to the negative terminal of the battery and the mercury is connected to the positive terminal?

A The wire swings into the page.

B The wire swings out of the page.

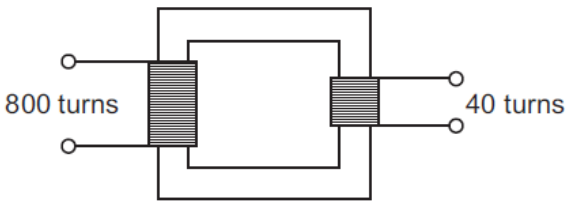
C The wire swings to the left.

D The wire swings to the right.

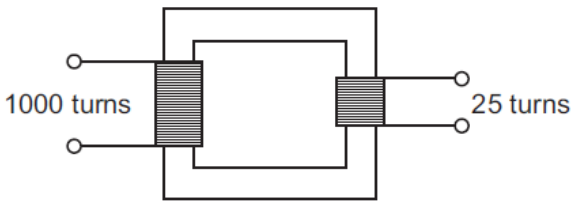
7. June/2022/Paper_13/No.36

Which transformer can change a 240 V a.c. input into a 15 V a.c. output?

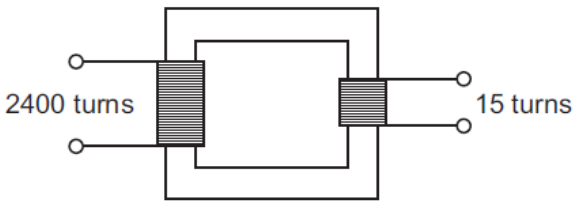
A



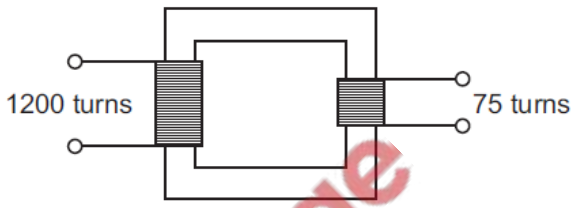
B



C



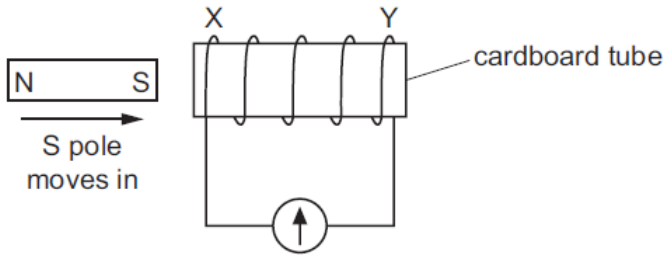
D



8. June/2022/Paper_22/No.35

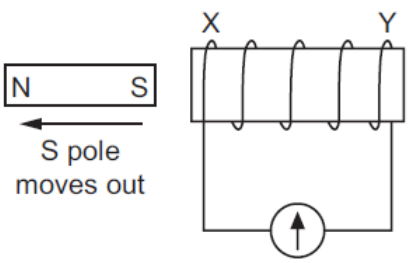
A coil XY is wound around a cardboard tube.

When the S pole of a magnet is pushed into the coil XY, the galvanometer deflects to the left.

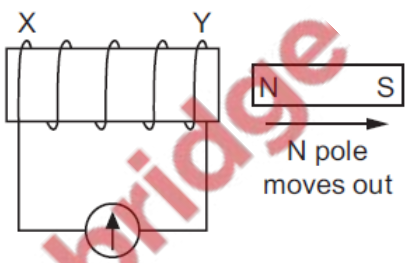


What other movement of the magnet will produce a deflection to the left?

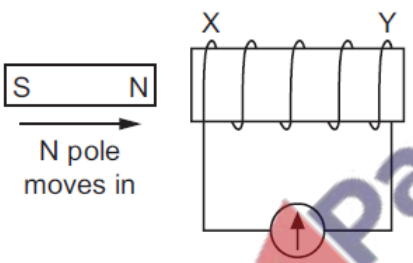
A



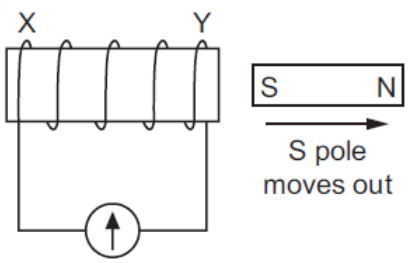
B



C



D



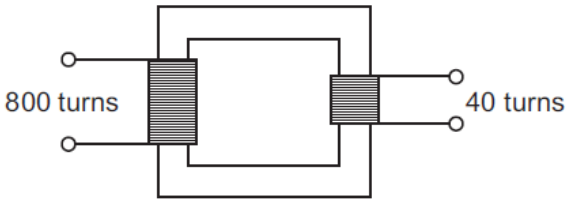
9. June/2022/Paper_22/No.36

Which transformer can change a 240 V a.c. input into a 15 V a.c. output?

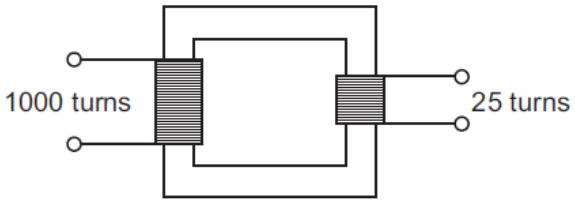
A B

Which transformer can change a 240 V a.c. input into a 15 V a.c. output?

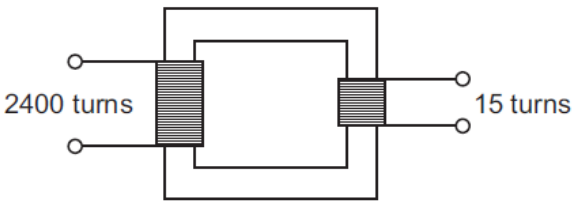
A



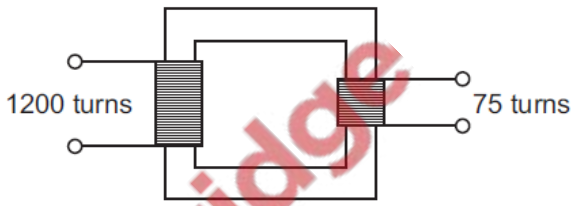
B



C

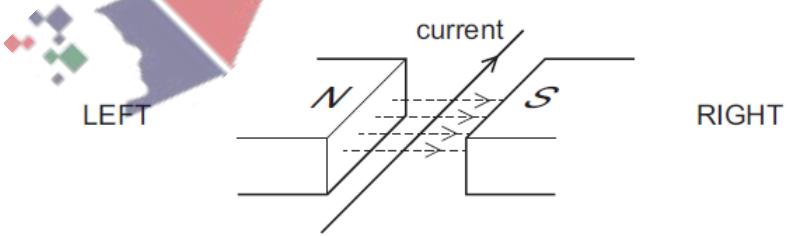


D



10. June/2022/Paper_22/No.37

The diagram shows a current-carrying wire in a magnetic field.



In which direction is the force acting on the wire?

A towards the bottom of the page

B to the left

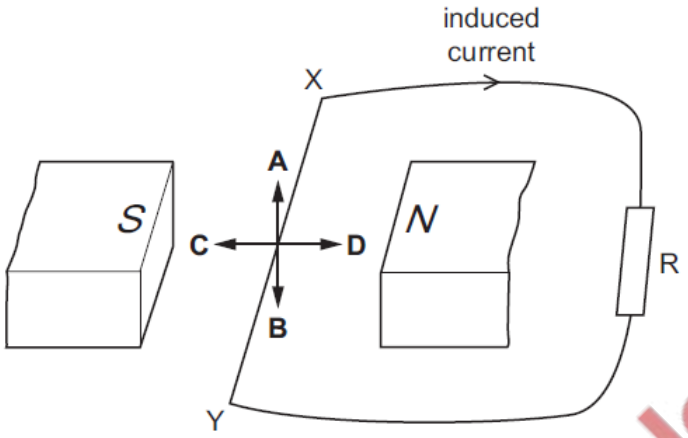
C to the right

D towards the top of the page

11. June/2022/Paper_23/No.35

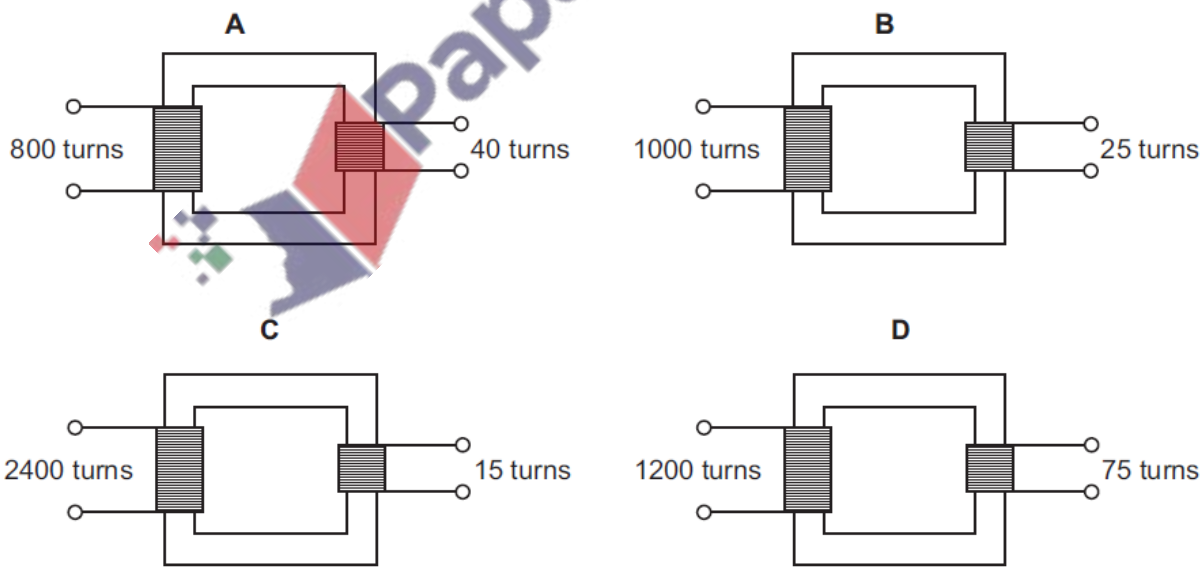
A wire XY is connected to a resistor R. The wire is moved in the magnetic field between two magnetic poles.

In which direction must the wire be moved so that the induced current is in the direction shown?



12. June/2022/Paper_23/No.36

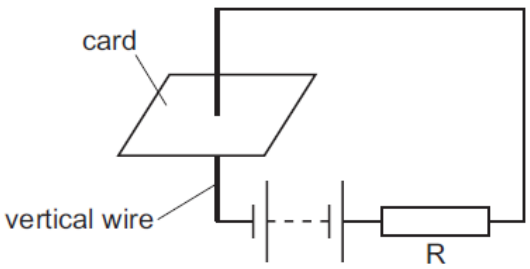
Which transformer can change a 240 V a.c. input into a 15 V a.c. output?

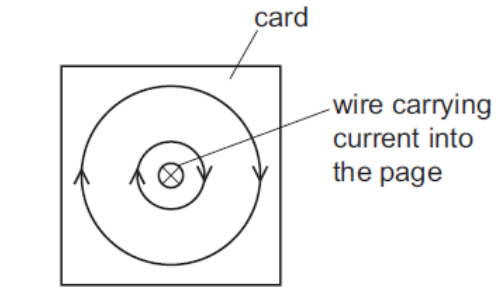


13. June/2022/Paper_23/No.37

The circuit shown consists of a vertical wire, a resistor R and a battery.

The magnetic field near the wire is also shown.





view from above showing the magnetic field

Two changes are made to the circuit:

- The polarity of the battery is reversed.
- The resistor R is replaced with another resistor with a lower resistance than R.

What effect will these changes have on the magnetic field near the wire?

	direction of magnetic field	strength of magnetic field
A	opposite	same
B	same	weaker
C	opposite	stronger
D	same	stronger

14. June/2022/Paper_21/No.35

A magnet is dropped vertically through a solenoid. This induces magnetic poles at both ends of the solenoid.

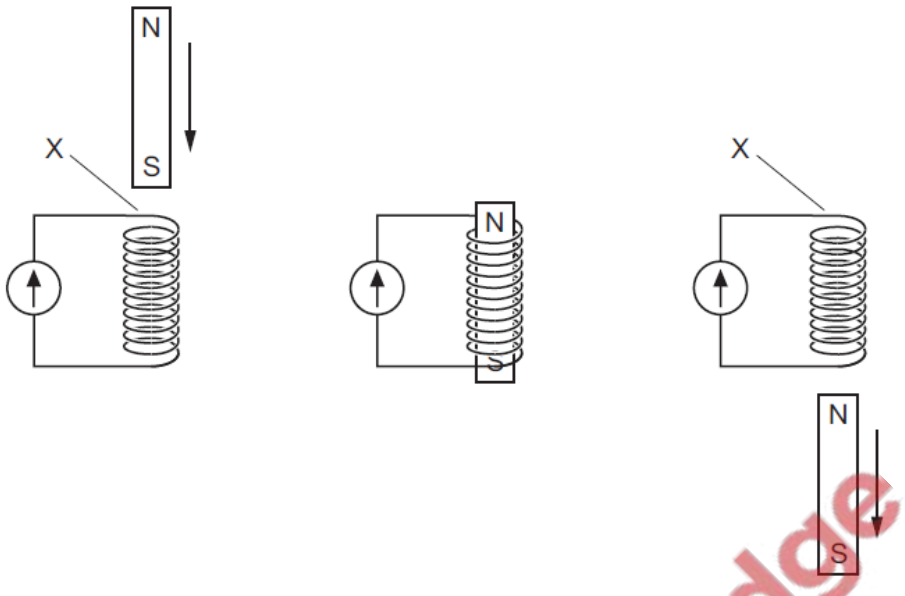


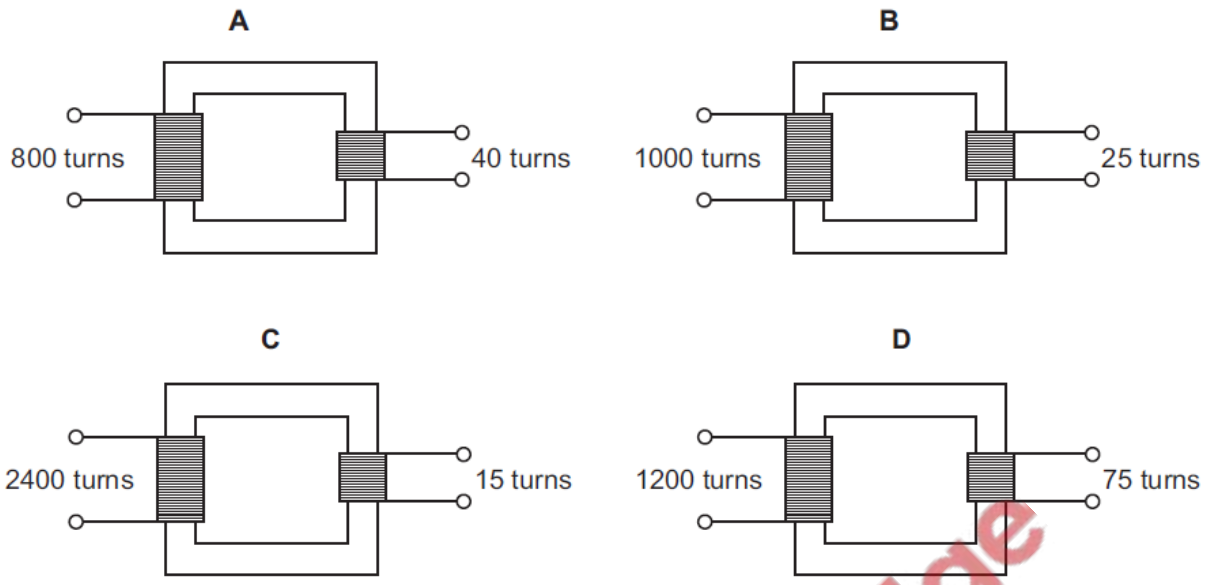
diagram 1 diagram 2 diagram 3

Which magnetic poles are induced at position X in diagram 1 and diagram 3?

	diagram 1	diagram 3
A	N pole	N pole
B	N pole	S pole
C	S pole	N pole
D	S pole	S pole

15. June/2022/Paper_21/No.36

Which transformer can change a 240 V a.c. input into a 15 V a.c. output?



16. June/2022/Paper_21/No.37

What is the purpose of the split-ring commutator in an electric motor?

A to ensure that the magnetic field in the motor changes direction every half rotation

B to ensure that the magnetic field in the motor stays in the same direction at all times

C to ensure that the turning effect on the motor changes direction every half rotation

D to ensure that the turning effect on the motor stays in the same direction at all times

17. June/2022/Paper_12/No.37

The coils in two electric motors are identical in size, but motor 1 is observed to spin more quickly than motor 2.

Three suggestions are made to explain this observation.

1 The current in the coil of motor 1 is greater than the current in the coil of motor 2.

2 The number of turns on the coil of motor 1 is greater than on the coil of motor 2.

3 The magnets in motor 1 are stronger than the magnets in motor 2.

Which suggestions give a possible explanation for this observation?

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

18. June/2022/Paper_31/No.10(b)

(b) The electric circuit for the microwave oven includes a transformer.
The voltage to the primary coil of the transformer V_p is 240 V.
The number of turns on the primary coil N_p is 70.

The number of turns on the secondary coil N_s is 560.

Calculate the secondary voltage V_s for the transformer.

V_s = ... V [3]

19. June/2022/Paper_32/No.4(b, c)

(b) The power station contains a transformer. The primary voltage V_p for the transformer is 25 000 V.
The number of turns on the primary coil N_p is 600.
The number of turns on the secondary coil N_s is 4800.

Calculate the secondary voltage V_s for the transformer.

V_s = ... V [3]

(c) Give **two** reasons for transmitting electrical energy at very high voltages.

1. .....

.....

2. .....

.....
[2]

20. June/2022/Paper_32/No.10

(a) Fig. 10.1 shows a wire passing through a card. There is a large electric current in the wire in the direction shown.
Fig. 10.2 shows the same arrangement when viewed from above the card.

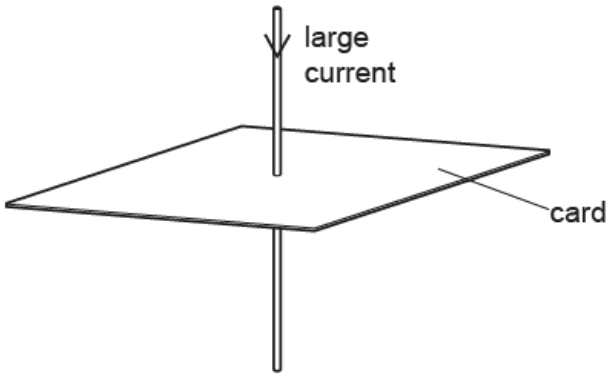


Fig. 10.1

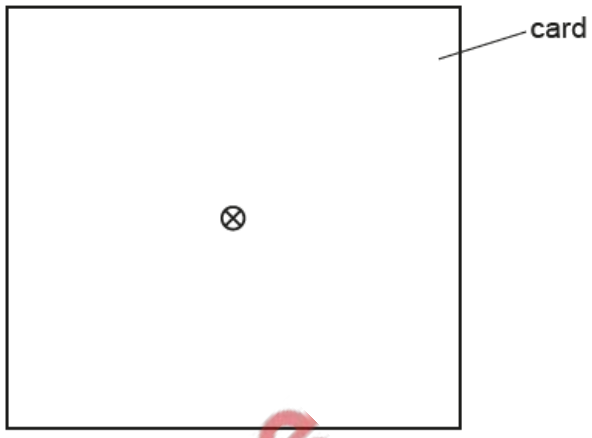


Fig. 10.2

There is a pattern of magnetic field lines around the wire due to the current in the wire.

On Fig. 10.2, draw the pattern and direction of the magnetic field as if viewed from above the card. [3]

(b) Fig. 10.3 shows a wire XY carrying a large electric current between the poles of a permanent magnet. There is an upward force on the wire XY.

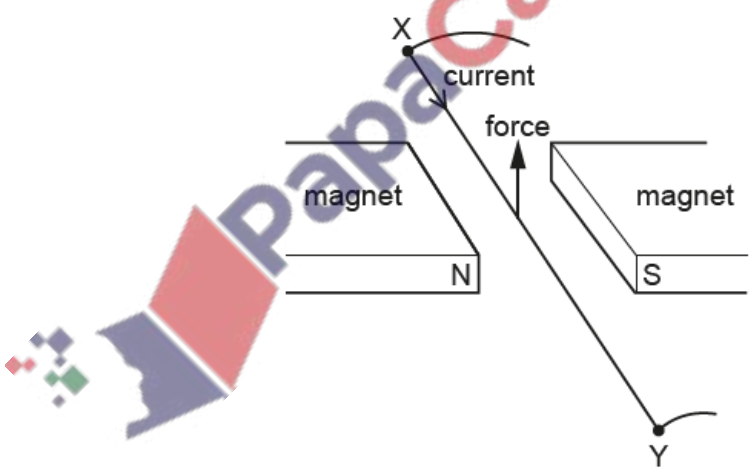


Fig. 10.3

(i) State **two** different ways of increasing the force due to the current in the wire XY.

.....

..... [2]

(ii) State **two** different ways of making the force on the wire XY act downwards.

.....

..... [2]

[Total: 7]

21. June/2022/Paper_33/No.8

(a) The device in Fig. 8.1 is connected to a 240 V mains supply.

The device produces a potential difference (p.d.) of 12 V between A and B.

A 12 V lamp is connected between A and B.

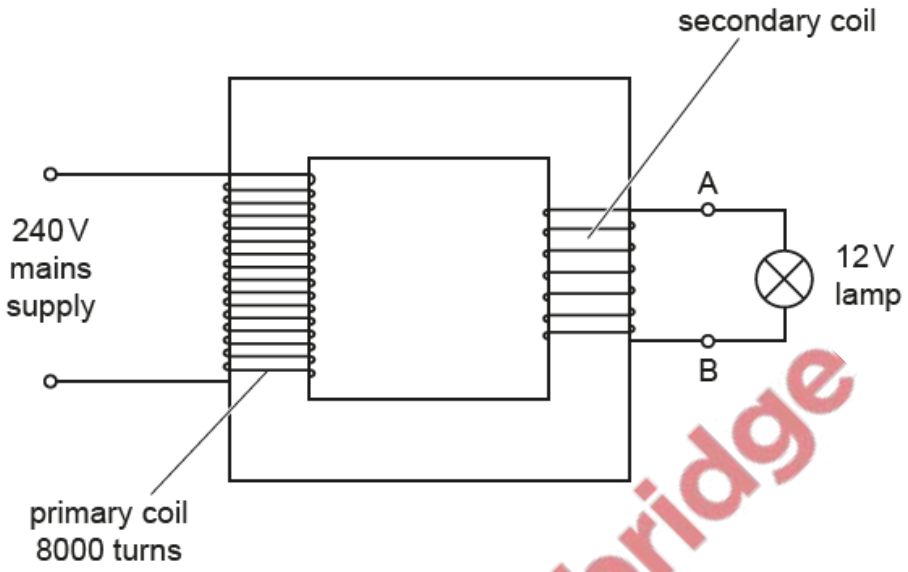


Fig. 8.1

(i) Calculate the number of turns on the secondary coil. Use information from Fig. 8.1.

number of turns = ... [3]

(ii) State the name of the device shown in Fig. 8.1.

..... [1]

(iii) The device includes two coils.

State the material used for the coils.

..... [1]

(b) The 12 V lamp is disconnected.

Two 6.0 V lamps and a 12 V motor are connected between A and B. The p.d. across each lamp is 6.0 V and the p.d. across the motor is 12 V.

Draw on Fig. 8.2 to show how to connect the lamps and the motor between A and B.

Fig. 8.2

[3]

[Total: 8]

22. June/2022/Paper_41/No.8

Fig. 8.1 shows two vertical, cylindrical tubes and a cylindrical magnet all held in a vacuum.

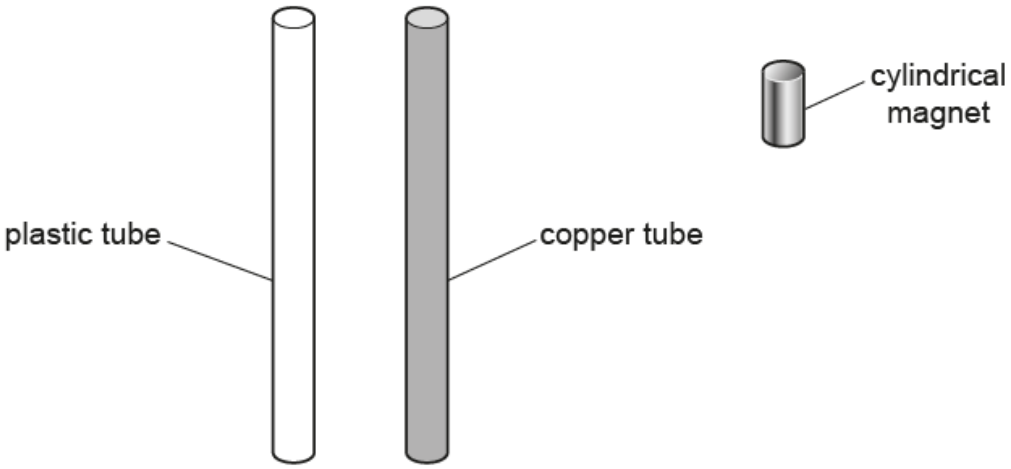


Fig. 8.1 (not to scale)

One tube is made of plastic and the other tube is made of copper. The two cylindrical tubes have identical dimensions.

The magnetic field of the small, cylindrical magnet is extremely strong.

Initially, the magnet is at rest at the top of the plastic tube.

The magnet is released and it falls through the plastic tube without experiencing a resistive force. The magnet takes 0.67 s to fall to the lower end of the plastic tube.

(a) The mass of the magnet is 0.012 kg.

Calculate the kinetic energy of the magnet when it reaches the lower end of the plastic tube.

kinetic energy = ... [4]

(b) The magnet is then held at the top of the copper tube and released. As it falls through the copper tube, an electric current is generated in the copper.

(i) Explain why there is a current in the copper.

.....

.....

..... [2]

(ii) The current in the copper produces a magnetic field of its own in the tube.

The magnet falls much more slowly in the copper tube than in the plastic tube.

Explain why the magnet falls more slowly in the copper tube.

.....

.....

..... [2]

[Total: 8]

23. June/2022/Paper_42/No.7

Fig. 7.1 shows a small plotting compass which is aligned with the magnetic field between magnetic poles A and B of a U-shaped magnet.

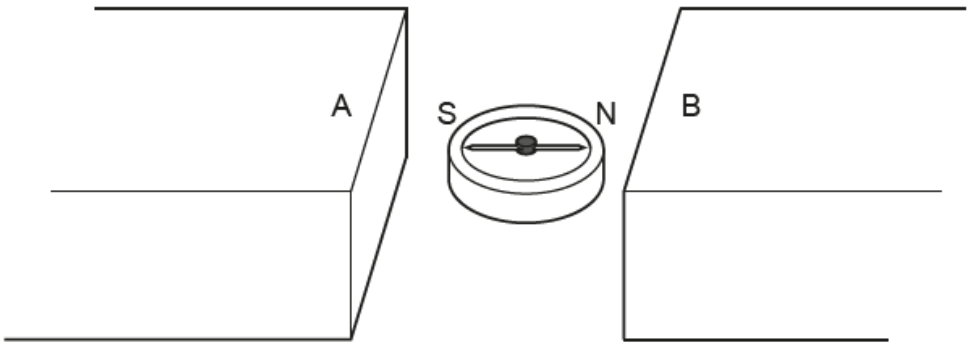


Fig. 7.1

(a) State the polarity of the poles.

pole A .....

pole B .....

[1]

(b) Fig. 7.2 shows a wire, placed between two poles, carrying a current in the direction of the arrow.

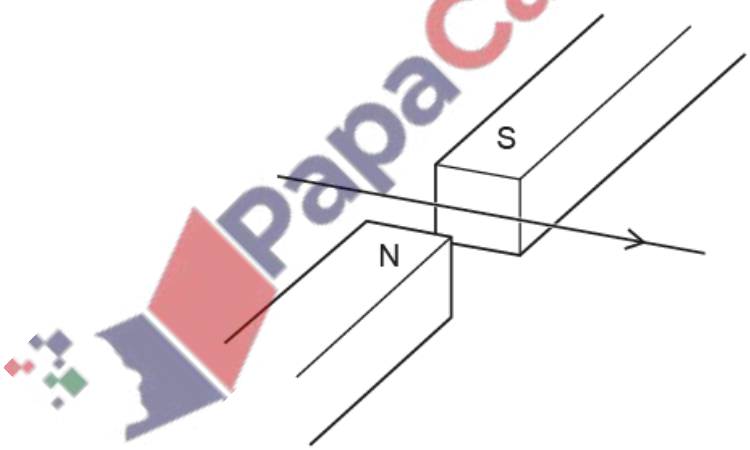


Fig. 7.2

On Fig. 7.2, draw an arrow to show the direction of the force on the wire due to the magnetic field. [2]

(c) Fig. 7.3 shows a β-particle moving in the direction of the arrow between the same two poles.

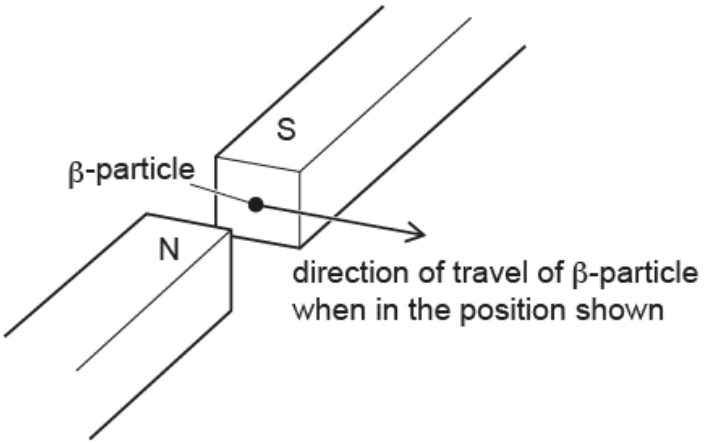


Fig. 7.3

On Fig. 7.3, draw an arrow to show the direction of the force on the β-particle due to the magnetic field. [2]

[Total: 5]

24. June/2022/Paper_43/No.9

(a) Fig. 9.1 shows a magnet on the end of a spring and a coil of wire connected to a sensitive centre-zero galvanometer. The magnet can move freely through the coil.

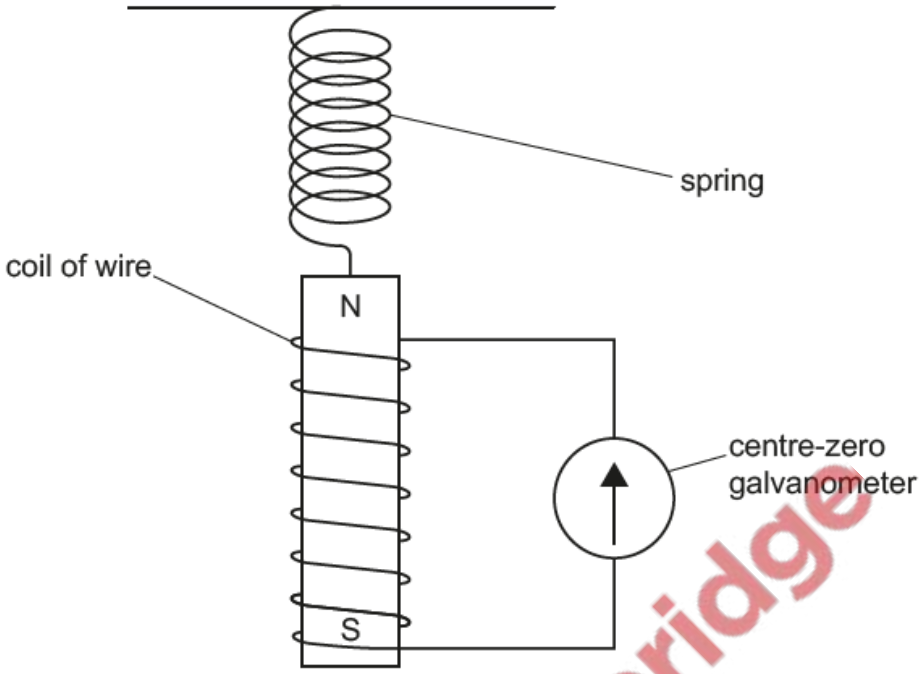


Fig. 9.1

(i) The magnet is pulled down and released.

Describe and explain what happens to the needle of the sensitive galvanometer.

.....

.....

.....

..... [4]

(ii) The magnet is replaced with a stronger magnet.

State the effect of using a stronger magnet on what happens to the needle of the galvanometer.

..... [1]

(b) A step-up transformer is used to step up the output voltage of a power station from 25 000 V to 400 000 V for transmission along power lines.

The number of turns on the secondary coil is 36 000.

Calculate the number of turns on the primary coil.

number of turns = ... [2]

[Total: 7]