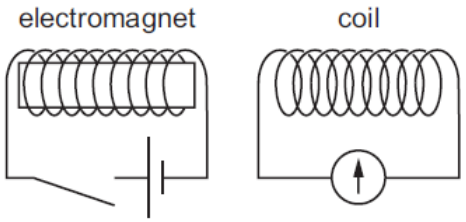
# Electromagnetic Induction – 2020 IGCSE 0625

**1.** Nov/2020/Paper_11/No.34

An electromagnet is positioned close to a coil of wire.




The electromagnet is switched on, remains on for a short time, and is then switched off.

Three statements about the pointer on the galvanometer during this sequence are given.

1 The pointer kicks to one side as the electromagnet is switched on.

2 The pointer records a steady non-zero value while the electromagnet remains switched on.

3 The pointer kicks to the other side as the electromagnet is switched off.

Which statements are correct?

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

**2.** Nov/2020/Paper_11/No.35

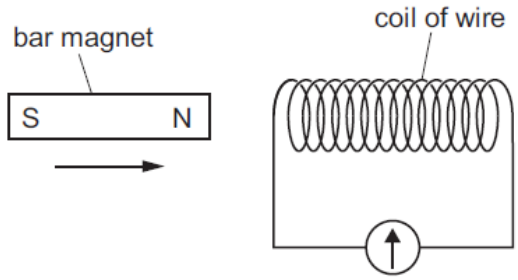
A transformer is needed to convert a supply of 240 V a.c. into 4800 V a.c..


Which pair of coils would be suitable for this transformer?

| | number of turns on primary coil $N_P$ | number of turns on secondary coil $N_S$ |
|---|---|---|
| **A** | 50 | 1 000 |
| **B** | 240 | 48 000 |
| **C** | 480 | 24 |
| **D** | 2000 | 100 |

**3.** Nov/2020/Paper_12/No.34

A student investigates electromagnetic induction. She moves the N pole of a magnet quickly towards a coil of wire. There is a reading on the galvanometer.




What can she do to get a greater reading on the galvanometer?

**A** Hold the bar magnet stationary inside the coil.

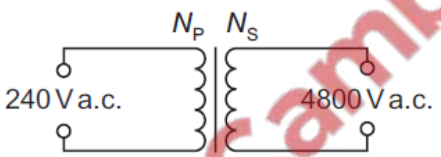
**B** Move the bar magnet slowly away from the coil.

**C** Use a coil of wire with fewer turns on it.

**D** Use a stronger bar magnet.

**4.** Nov/2020/Paper_12/No.35

A transformer is needed to convert a supply of 240 V a.c. into 4800 V a.c..



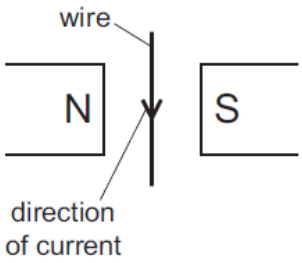

Which pair of coils would be suitable for this transformer?

| | number of turns on primary coil $N_P$ | number of turns on secondary coil $N_S$ |
|---|---|---|
| **A** | 50 | 1 000 |
| **B** | 240 | 48 000 |
| **C** | 480 | 24 |
| **D** | 2000 | 100 |

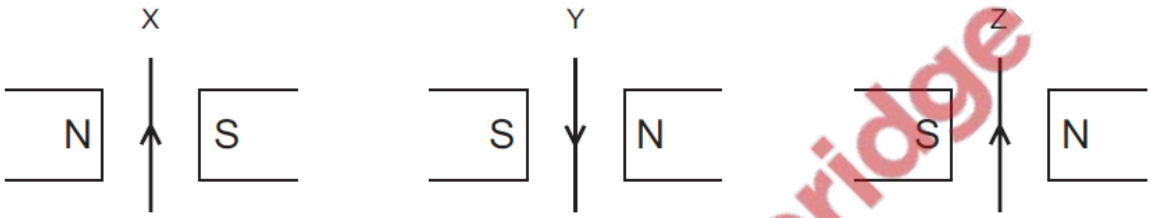
**5.** Nov/2020/Paper_12/No.36

The diagram shows a wire carrying a current in the direction shown. The wire is between the poles of a magnet.

A force is produced on the wire out of the page.




The wire and magnet are now put into different arrangements X, Y and Z. The arrow shows the direction of the current in each case.




In which arrangements is the force on the wire out of the page?

**A** X only **B** X and Y **C** X and Z **D** Z only

**6.** Nov/2020/Paper_13/No.34

When a metal wire moves up, cutting a magnetic field, an electromotive force (e.m.f.) is induced across the wire.

Which change affects the magnitude of the induced e.m.f.?

**A** moving the wire down at the same speed

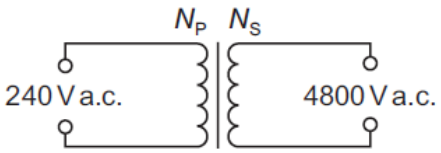
**B** moving the wire up at a faster speed

**C** using a thicker wire

**D** using a wire made from a different metal

**7.** Nov/2020/Paper_13/No.35

A transformer is needed to convert a supply of 240 V a.c. into 4800 V a.c..

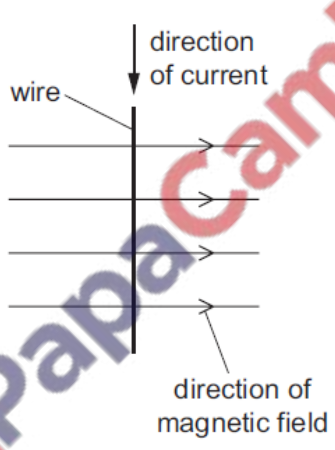



Which pair of coils would be suitable for this transformer?

| | number of turns on primary coil $N_P$ | number of turns on secondary coil $N_S$ |
|---|---|---|
| **A** | 50 | 1 000 |
| **B** | 240 | 48 000 |
| **C** | 480 | 24 |
| **D** | 2000 | 100 |

**8.** Nov/2020/Paper_13/No.36

The diagram shows a wire carrying a current in the direction shown. There is a magnetic field acting from left to right. The wire experiences a force acting out of the page.




The current is now reversed.

In which direction does the force on the wire now act?

**A** into the page

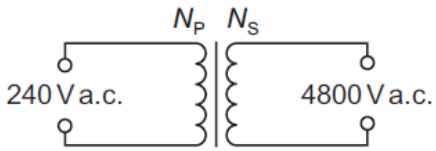
**B** out of the page

**C** to the left

**D** to the right

**9.** Nov/2020/Paper_21/No.35

A transformer is needed to convert a supply of 240 V a.c. into 4800 V a.c..

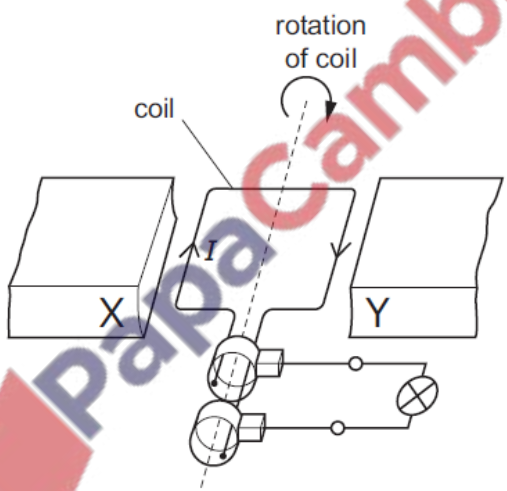



Which pair of coils would be suitable for this transformer?

| | number of turns on primary coil $N_P$ | number of turns on secondary coil $N_S$ |
|---|---|---|
| **A** | 50 | 1 000 |
| **B** | 240 | 48 000 |
| **C** | 480 | 24 |
| **D** | 2000 | 100 |

**10.** Nov/2020/Paper_22/No.34

The diagram shows an a.c. generator used to power a lamp. The coil rotates in a clockwise direction.

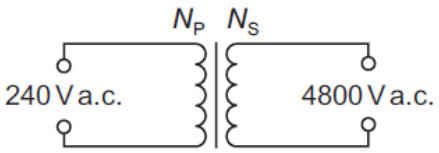



Which magnetic poles are X and Y?

| | X | Y |
|---|---|---|
| **A** | N pole | N pole |
| **B** | N pole | S pole |
| **C** | S pole | N pole |
| **D** | S pole | S pole |

**11.** Nov/2020/Paper_22/No.35

A transformer is needed to convert a supply of 240 V a.c. into 4800 V a.c..




Which pair of coils would be suitable for this transformer?

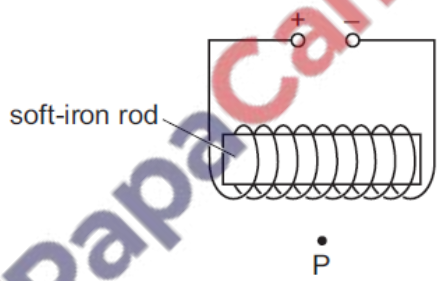
| | number of turns on primary coil $N_P$ | number of turns on secondary coil $N_S$ |
|---|---|---|
| **A** | 50 | 1 000 |
| **B** | 240 | 48 000 |
| **C** | 480 | 24 |
| **D** | 2000 | 100 |

**12.** Nov/2020/Paper_22/No.36

The diagram shows a coil of wire wrapped around a soft-iron rod.

The wire is connected to a d.c. power supply as indicated.

The apparatus is in a region which is totally shielded from the Earth's magnetic field.




A small compass needle is placed at point P.

In which direction does the N pole of the compass needle point?

**A** towards the bottom of the page

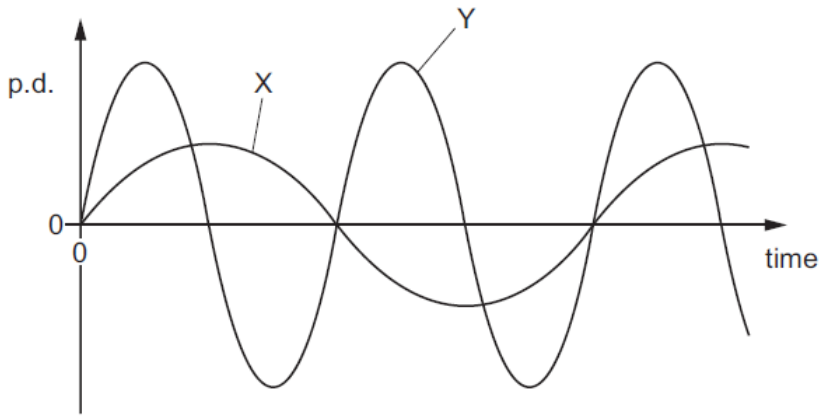
**B** towards the left of the page

**C** towards the right of the page

**D** towards the top of the page

**13.** Nov/2020/Paper_23/No.34

Graph X shows the output from an a.c. generator.




Which changes can be made so that the generator produces graph Y?

**A** Decrease the magnetic field strength and decrease the speed of rotation only.

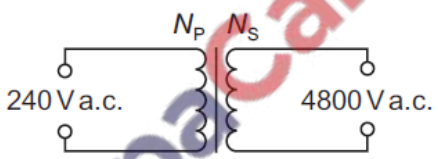
**B** Increase the magnetic field strength and decrease the number of coils only.

**C** Increase the number of coils only.

**D** Increase the speed of rotation only.

**14.** Nov/2020/Paper_23/No.35

A transformer is needed to convert a supply of 240 V a.c. into 4800 V a.c..




Which pair of coils would be suitable for this transformer?

| | number of turns on primary coil $N_P$ | number of turns on secondary coil $N_S$ |
|---|---|---|
| **A** | 50 | 1 000 |
| **B** | 240 | 48 000 |
| **C** | 480 | 24 |
| **D** | 2000 | 100 |

**15.** Nov/2020/Paper_31/No.12

**(a)** Fig. 12.1 shows two circuits, A and B, linked by a relay.

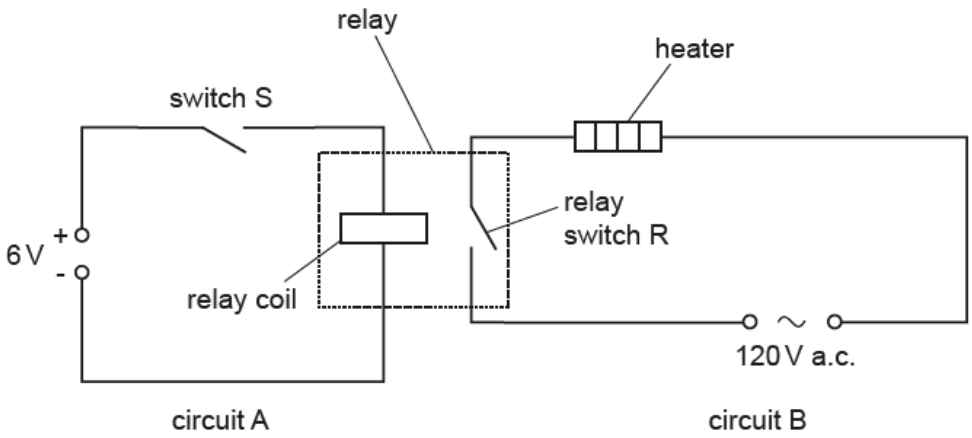



**Fig. 12.1**

Describe what happens in the two circuits when switch S is closed.

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..... [3]

**(b)** Another circuit includes a transformer. The input voltage of the transformer is 120 V a.c. The input coil has 480 turns of wire and the output coil has 60 turns of wire.

Calculate the output voltage of the transformer.

output voltage = ..... V [3]

[Total: 6]

**16.** Nov/2020/Paper_32/No.11

Fig. 11.1 represents a transformer. The primary coil has 300 turns and the secondary coil has 30 turns. The input voltage is 230 V a.c.

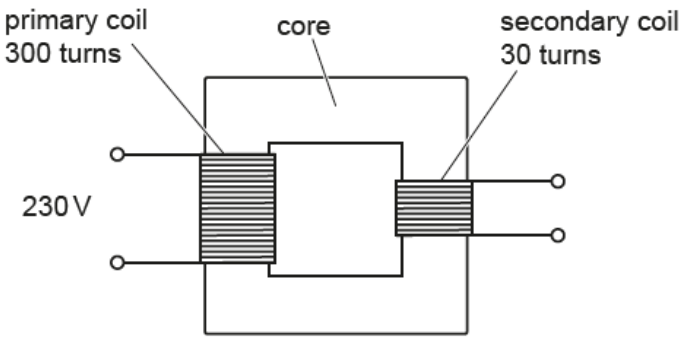


**Fig. 11.1**

**(a)** Calculate the voltage across the secondary coil.

voltage = ..... V [3]

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

..... [1]

**(c)** Some transformers produce high electrical voltage for the transmission of electrical energy. Describe **two** advantages of high-voltage transmission.

1. .....

.....

2. .....

.....

[2]

[Total: 6]

**17.** Nov/2020/Paper_33/No.10

**(a)** Describe an experiment to show that a force acts on a current-carrying conductor placed in a magnetic field. You may draw a diagram to help your answer.

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..... [4]

**(b)** A current in a wire can cause the wire to get hot and melt the wire.

Describe how to reduce the heating effect of a current.

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..... [1]

[Total: 5]

**18.** Nov/2020/Paper_43/No.9

**(a)** Electrical power is produced in a power station by an alternating current (a.c.) generator. The output of the generator has a voltage of 22 000 V. The electrical power is transmitted at a voltage of 400 000 V.

Explain why electrical power is transmitted at a voltage of 400 000 V and not 22 000 V.

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..... [3]

**(b)** A computer contains a transformer.

The input voltage to the transformer is 240 V. The output voltage from the transformer is 20 V and the output current is 2.3 A.

The efficiency of the transformer is 90%.

Calculate the input current to the transformer.



current = ..... [5]

[Total: 8]