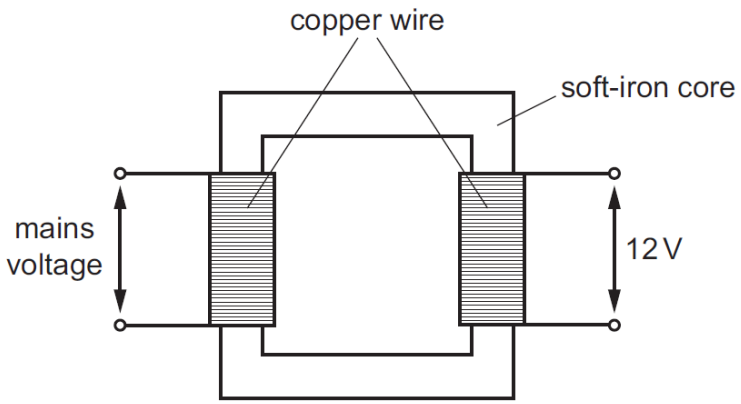
Electromagnetic Induction – 2021 IGCSE 0625

1. Nov/2021/QPaper_11/No.29

The step-down transformer shown reduces mains voltage to 12 V.



When the transformer is used, some energy is transferred to the surroundings.

Which type of energy is transferred to the surroundings?

A chemical energy

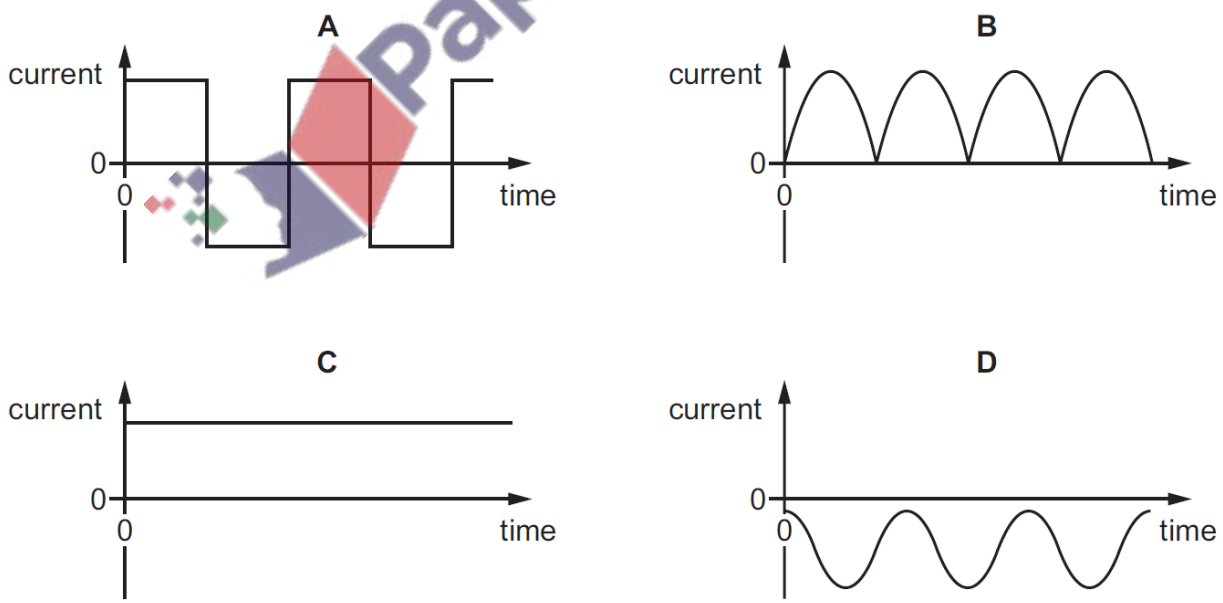
B light energy

C thermal energy

D elastic energy

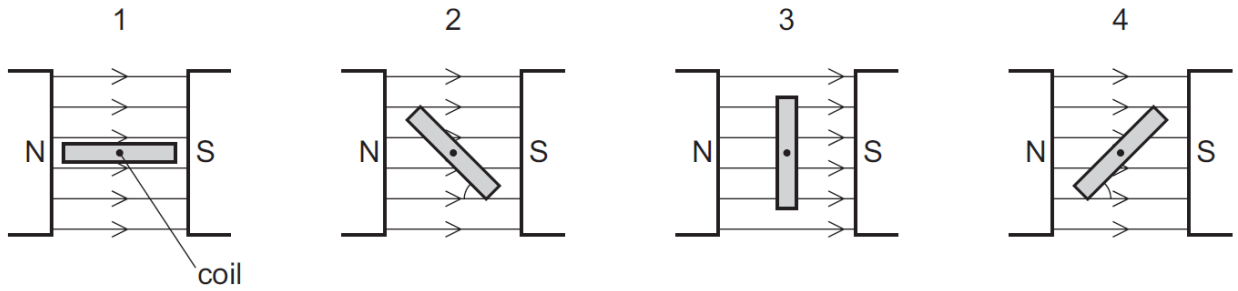
2. Nov/2021/QPaper_11,21/No.35

Which graph represents an alternating current (a.c.)?



3. Nov/2021/QPaper_12&22/No.35

Four positions of a current-carrying coil in a magnetic field, as in a d.c. motor, are shown. In diagrams 2 and 4, the coil is at an angle of 45° to the field lines.

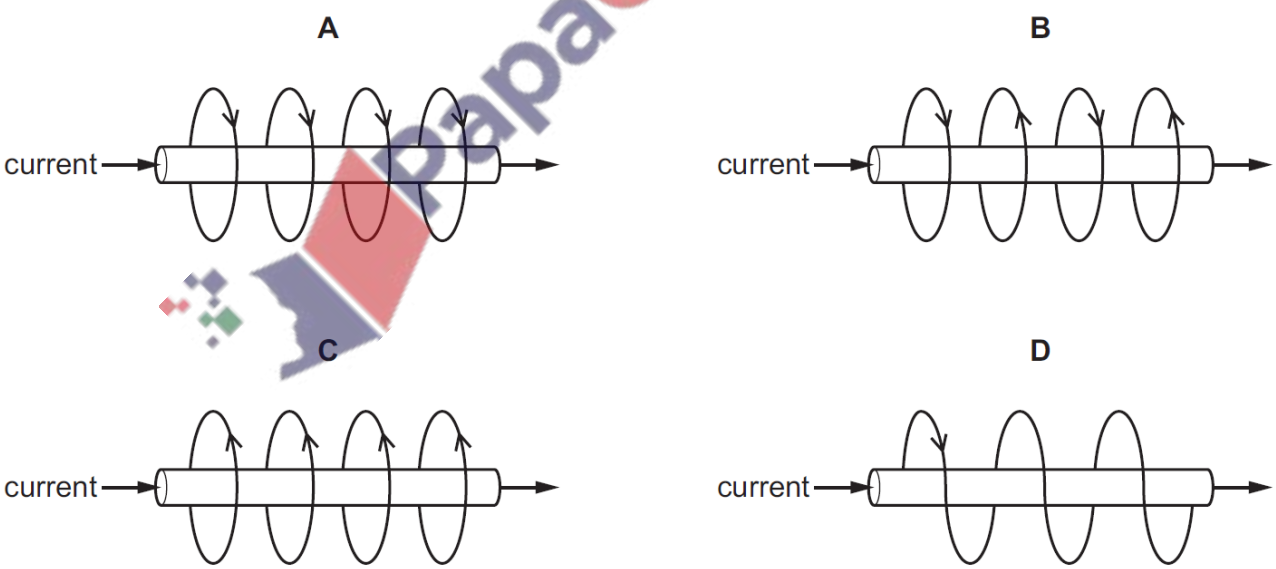


Which row is correct?

	turning effect of the forces in positions 1 and 3	turning effect of the forces in positions 2 and 4
A	different	different
B	different	same
C	same	different
D	same	same

4. Nov/2021/QPaper_13&23/No.35

Which diagram shows the magnetic field around a straight, current-carrying wire?



5. Nov/2021/QPaper_21/No.34

What is the function of the split-ring commutator in an electric motor with a single rotating coil?

A to enable the motor to function with an a.c. source

B to reverse the current in the coil once every revolution

C to reverse the current in the coil whenever its plane becomes perpendicular to the magnetic field

D to reverse the current in the coil whenever its plane is parallel with the magnetic field

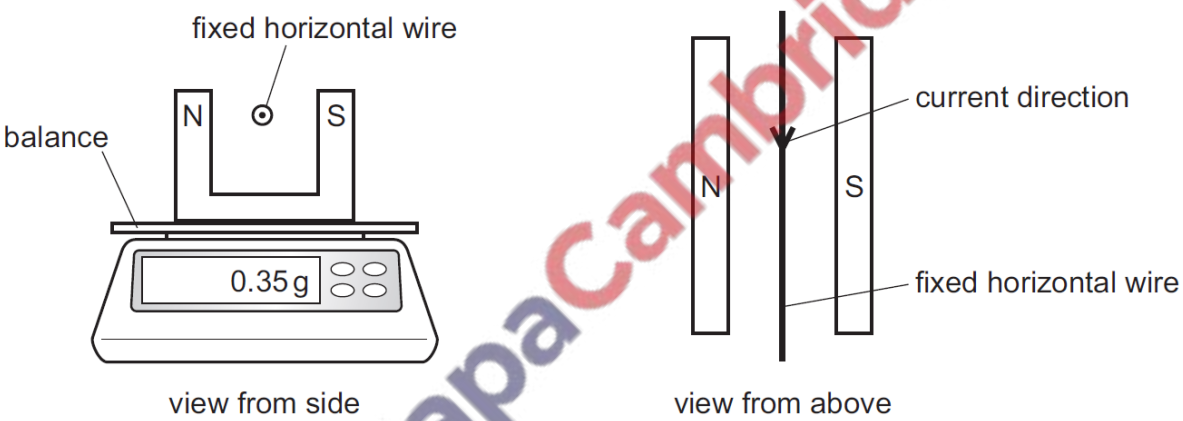
6. Nov/2021/QPaper_21/No.36

The diagrams show a horizontal wire in a magnetic field.

The horizontal wire is firmly held at each end (not shown) and cannot move.

The magnets and holder are on a balance.

When there is no current in the wire, the reading on the balance is 0.35 g.



There is a d.c. current in the wire, as shown.

What happens to the reading on the balance?

A smaller than 0.35 g

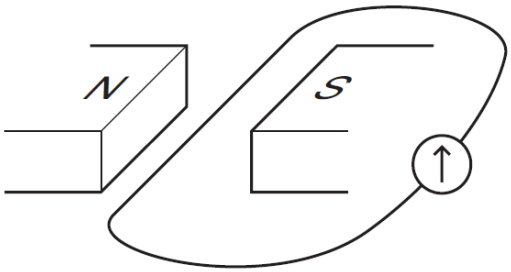
B no change

C changing from smaller to larger than 0.35 g repeatedly

D larger than 0.35 g

7. Nov/2021/QPaper_22/No.34

The diagram shows a wire between two magnets. An electromotive force (e.m.f.) is induced in the wire when it is moved up between the two magnets.



Four tests are done.

1 The direction of movement of the wire is reversed.

2 The direction of the magnetic field is reversed.

3 The wire is moved more quickly.

4 The magnetic field strength is decreased.

Which tests will induce a smaller e.m.f. in the wire?

A 1 and 2 **B** 1 and 3 **C** 3 and 4 **D** 4 only

8. Nov/2021/QPaper_23/No.36

The coil in a d.c. motor is connected to a split-ring commutator.

What is the purpose of the split-ring commutator?

A to ensure that the coil continues to rotate in the same direction

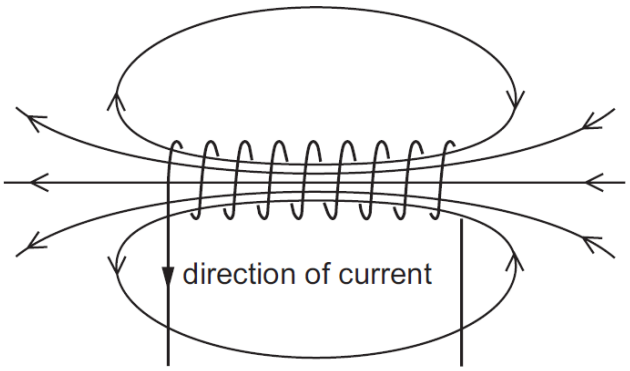
B to ensure that the size of the current in the coil remains constant

C to ensure that the size of the turning effect on the coil remains constant

D to ensure that the turning effect on the coil changes direction

9. Nov/2021/QPaper_22/No.36

The diagram shows the magnetic field due to a current in a solenoid.



The direction of the current is reversed.

Which row describes the effect that this has on the magnitude and on the direction of the magnetic field?

	magnitude of magnetic field	direction of magnetic field
A	increases	changes
B	increases	unchanged
C	unchanged	changes
D	unchanged	unchanged

10. Nov/2021/QPaper_23/No.34

Electrical energy is transferred by transmission lines at high voltage.

Which statement explains why a high voltage is used?

A The voltage is alternating.

B The transmission lines have a larger resistance.

C The transmission lines carry greater power.

D There is a smaller current in the transmission lines for the same power.

11. Nov/2021/QPaper_31/No.10

(a) A student plans to demonstrate the induction of an electromotive force (e.m.f.) in a wire.

He has a length of wire, a sensitive centre-reading galvanometer and a permanent magnet.

(i) Describe how the student uses the equipment.

.....

..... [2]

(ii) State **two** ways in which the student can increase the size of the induced e.m.f.

1 .....

2 .....

[2]

(b) Fig. 10.1 shows a d.c. motor.

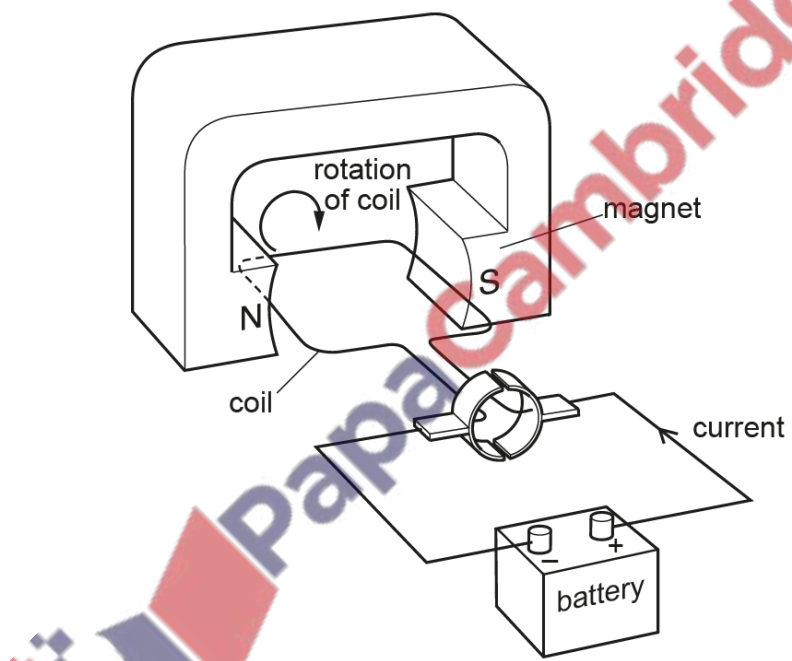


Fig. 10.1

(i) On Fig. 10.1, draw an arrow between the poles of the magnet to show the direction of the magnetic field. [1]

(ii) State **two** ways of making the coil spin faster.

1 .....

2 .....

[2]

(iii) State **one** way of making the coil spin in the opposite direction.

..... [1]

[Total: 8]

12. Nov/2021/QPaper_32/No.11

(a) Fig. 11.1 shows a magnet and a coil of wire connected to a galvanometer.

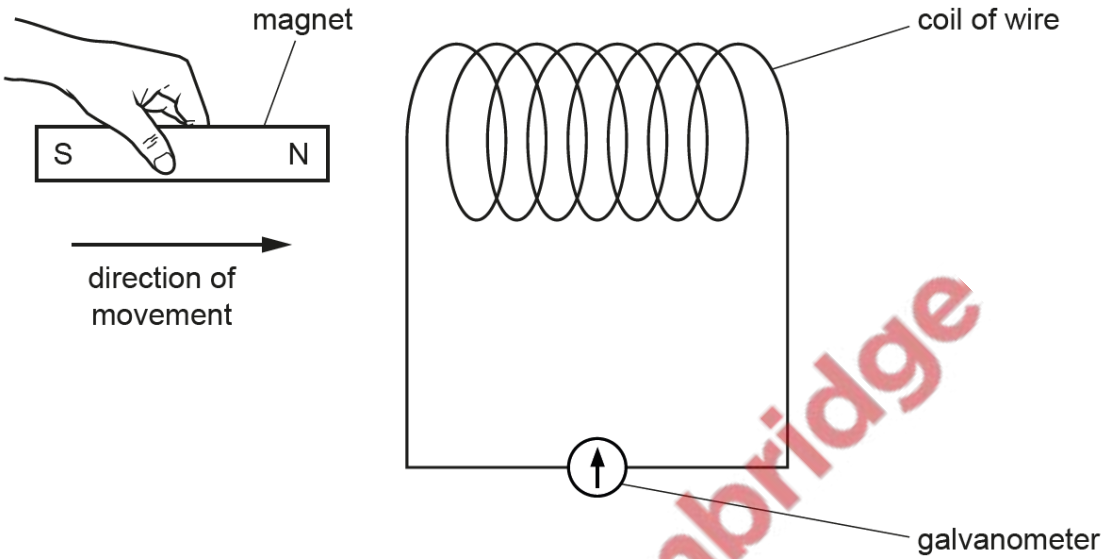


Fig. 11.1

A student slowly moves the magnet into the coil. The pointer on the galvanometer moves to the left. This deflection shows that an electromotive force (e.m.f.) is induced in the coil.

State **three** ways of increasing the size of the e.m.f. in the coil.

1 .....

2 .....

3 .....

[3]

(b) Fig. 11.2 shows a transformer.

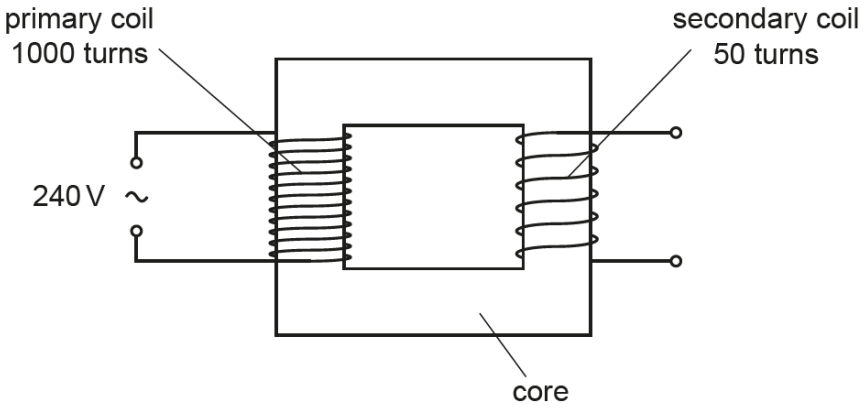


Fig. 11.2

(i) Name **one** material that is suitable for the core of the transformer.

..... [1]

(ii) The primary coil has 1000 turns and its input is 240 V a.c.
The secondary coil has 50 turns.

Calculate the output voltage across the secondary coil.

output voltage = ... V [3]

[Total: 7]

13. Nov/2021/QPaper_33/No.10

(a) Fig. 10.1 shows the arrangement for transferring electrical energy from a power station to homes and factories.

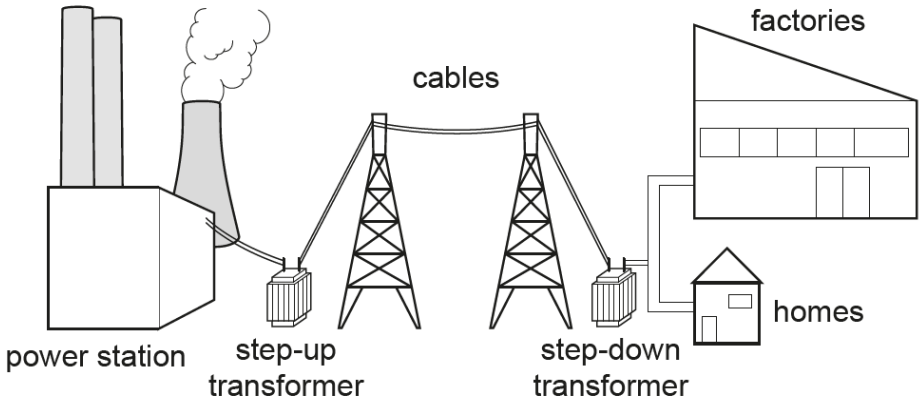


Fig. 10.1

Explain why the arrangement includes a step-up transformer and a step-down transformer.

.....

.....

.....

.....

..... [4]

(b) A transformer has 2000 turns on the primary coil and 500 turns on the secondary coil. The potential difference (p.d.) across the primary coil is 240 V a.c.

Calculate the p.d. across the secondary coil.

p.d. across the secondary coil = ...V [3]

[Total: 7]

14. Nov/2021/QPaper_43/No.10

(a) A transformer has 500 turns on the primary coil and 25 turns on the secondary coil. The input voltage is 120 V.

(i) Calculate the output voltage.

output voltage = ... [2]

(ii) The current in the primary coil is 125 mA. The transformer is 100% efficient.

Calculate the output current.

output current = ... [2]

(b) Fig. 10.1 shows a loose wire connected in a circuit with a d.c. (direct current) power supply and a switch. The length of the wire between the two supports is in the magnetic field of a horseshoe magnet.

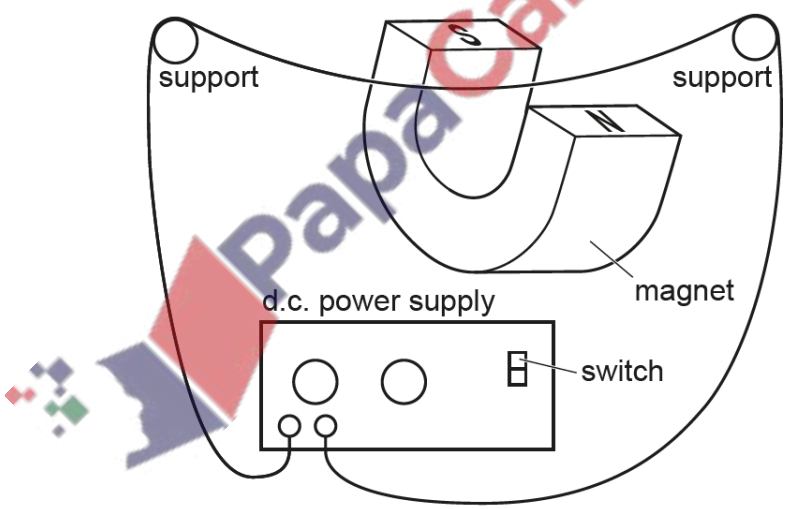


Fig. 10.1

The power supply is switched on and the wire moves down.

(i) On Fig. 10.1, draw an arrow on the wire to show the direction of the current. [1]

(ii) The power supply is switched off and the wire returns to its original position. The power supply is then switched on so that the current is in the opposite direction.

State and explain what happens to the wire.

.....

..... [2]

(c) A split-ring commutator is an important feature of a d.c. motor.

Suggest **one** reason why the d.c. motor cannot operate without a split-ring commutator.

..... [1]

[Total: 8]