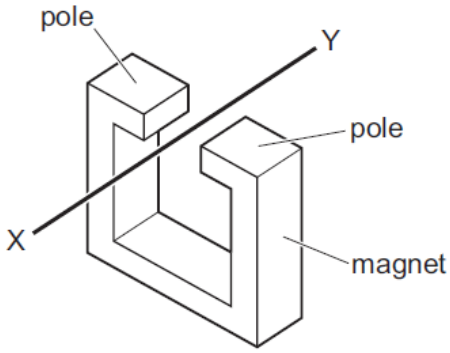
# Electromagnetic effects – 2023 June O Level 5054

**1.** June/2023/Paper_ 5054/11/No.32

When wire XY is moved downwards between the poles of a stationary magnet, an e.m.f. is produced across X and Y.




Which action produces an e.m.f. across X and Y in the opposite direction?

**A** Move both the wire and the magnet upwards at the same speed.

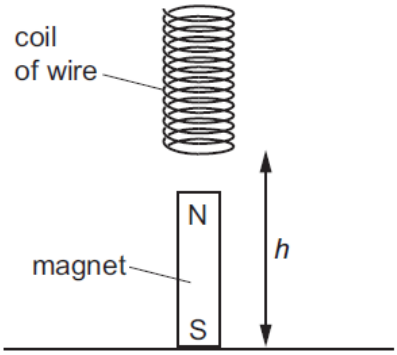
**B** The wire is kept stationary and the magnet is moved upwards.

**C** The wire is moved downwards and the magnet is moved upwards.

**D** The wire is moved upwards and the magnet is kept stationary.

**2.** June/2023/Paper_ 5054/12/No.32

A coil of wire above a magnet is dropped. As the coil falls over the magnet, an e.m.f. is induced across the coil.




What does **not** affect the magnitude of the e.m.f. induced across the coil?

**A** changing the number of turns of wire in the coil

**B** changing the height *h* from which the coil is dropped

**C** changing the direction of the magnet, so the north pole is at the bottom

**D** changing the strength of the magnetic field from the magnet

**3.** June/2023/Paper_ 5054/21/No.9

Fig. 9.1 shows a simple a.c. generator.

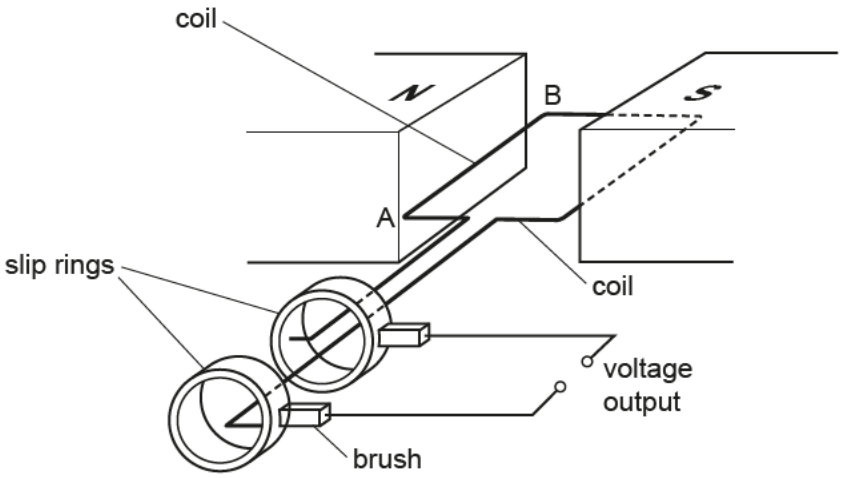



**Fig. 9.1**

**(a)** Explain why there is a voltage induced in the coil when the coil is turned.

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.....

..... [2]

**(b)** In Fig. 9.1 the coil is horizontal, with side AB on the left. The output voltage is +6.0 V.

On Fig. 9.2 draw a line from each of the shaded boxes to one of the circled voltages to show the voltage output when the coil is in different positions.

One line has been drawn for you.

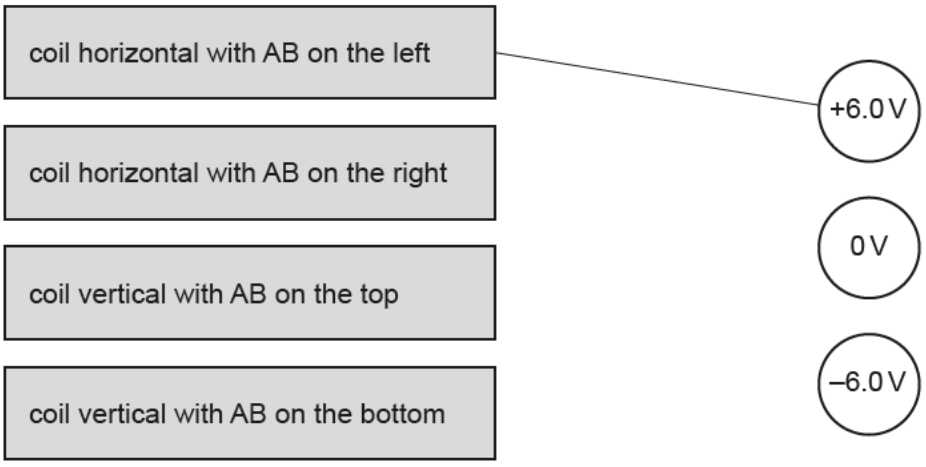


**Fig. 9.2**

[2]

**(c)** Both an a.c. generator and a d.c. motor contain a coil and brushes.

**(i)** Fig. 9.1 shows how the brushes are connected to the coil in an a.c. generator.

Draw a diagram to show how the brushes are connected to the coil in a d.c. motor.

[2]

**(ii)** State why there are forces on the sides of the coil in a d.c. motor.

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..... [1]

[Total: 7]

**4.** June/2023/Paper_ 5054/22/No.8

Fig. 8.1 shows a step-down transformer used to operate an electric bell.

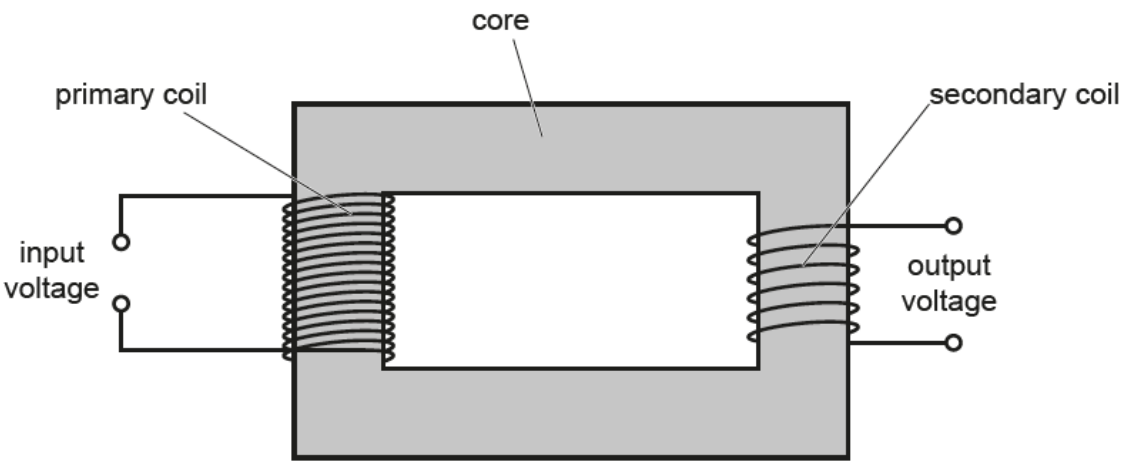


**Fig. 8.1**

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

..... [1]

**(b)** A current in the primary coil produces a magnetic field in the core.

Explain how an alternating voltage is produced in the secondary coil.

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..... [3]

**(c)** The transformer has 4600 turns on the primary coil which is connected to a mains supply of 230 V.

An output of 5.0 V is used to operate the bell.

Calculate the number of turns needed on the secondary coil.

number of turns = ..... [2]

**(d)** State one change that can be made to the transformer shown in Fig. 8.1 so that it can be used as a step-up transformer.

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..... [1]

[Total: 7]