

Electromagnetic effects – 2022 Nov O Level 5054

1. Nov/2022/Paper_11/No.33

Which statement about a transformer is correct?

- A** The changing magnetic field in the transformer induces an e.m.f. in the secondary coil.
- B** The core of the transformer is made of iron because iron is a good electrical conductor.
- C** The transformer converts alternating current to direct current.
- D** The transformer converts direct current to alternating current.

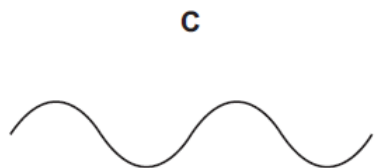
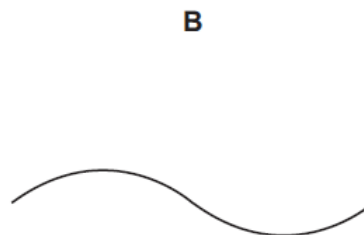
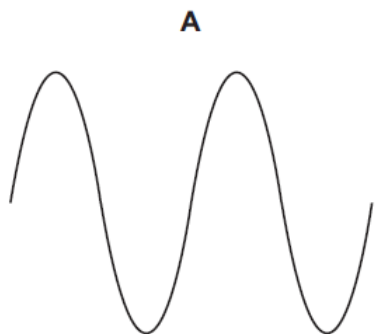
2. Nov/2022/Paper_11/No.34

The diagram shows the output from an a.c. generator displayed on an oscilloscope screen.



The generator is turned at a slower rate. The settings on the oscilloscope controls are not changed.

Which diagram shows the new output?

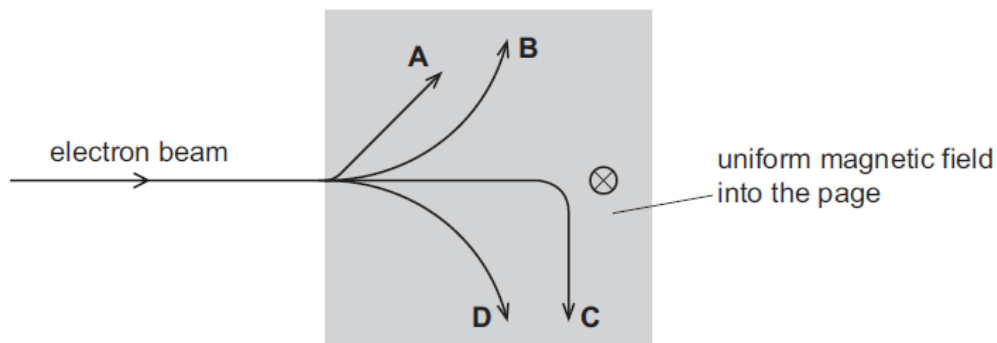


3. Nov/2022/Paper_11/No.37

A beam of electrons is fired into a uniform magnetic field as shown.

The direction of the magnetic field is into the page.

Which path do the electrons follow?

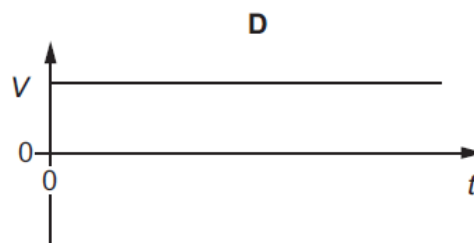
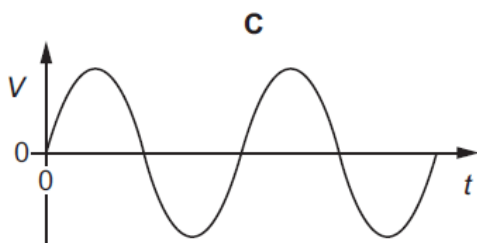
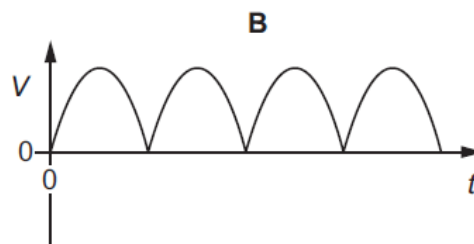
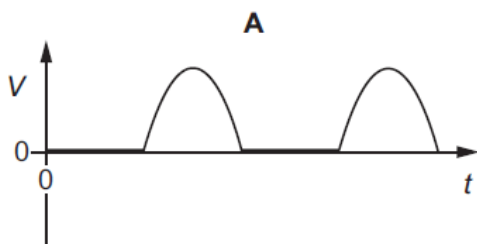


4. Nov/2022/Paper_12/No.35

A coil of wire is rotated at a constant rate between the poles of a U-shaped magnet.

The two ends of the coil are connected to different slip rings.

Which graph shows how the voltage V between the slip rings varies with time t ?



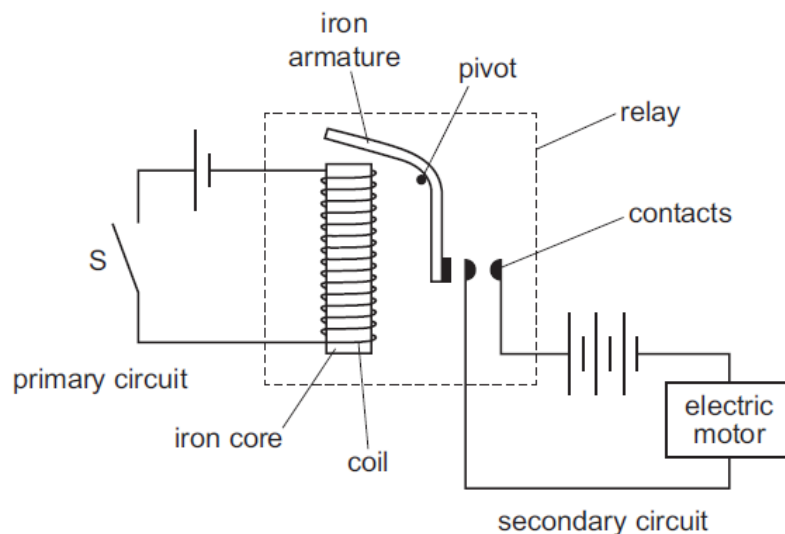
5. Nov/2022/Paper_12/No.36

Which statement about a transformer is correct?

- A The changing magnetic field in the transformer induces an e.m.f. in the secondary coil.
- B The core of the transformer is made of iron because iron is a good electrical conductor.
- C The transformer converts alternating current to direct current.
- D The transformer converts direct current to alternating current.

6. Nov/2022/Paper_12/No.38

The diagram shows a relay used to switch on an electric motor.



A student makes five statements to explain how the relay switches on the electric motor. The statements are **not** in the correct order.

- 1 The current in the coil magnetises the electromagnet.
- 2 The armature closes the contacts.
- 3 The current in the secondary circuit makes the motor turn.
- 4 The electromagnet attracts the iron armature.
- 5 The switch S in the primary circuit is closed.

What is the correct order of the statements?

- A 1 → 5 → 2 → 4 → 3
- B 3 → 2 → 4 → 1 → 5
- C 3 → 4 → 1 → 5 → 2
- D 5 → 1 → 4 → 2 → 3

7. Nov/2022/Paper_21/No.6

An electromagnet is used to separate objects that are magnetic from objects that are non-magnetic.

Fig. 6.1 shows the electromagnet suspended from the arm of a crane.

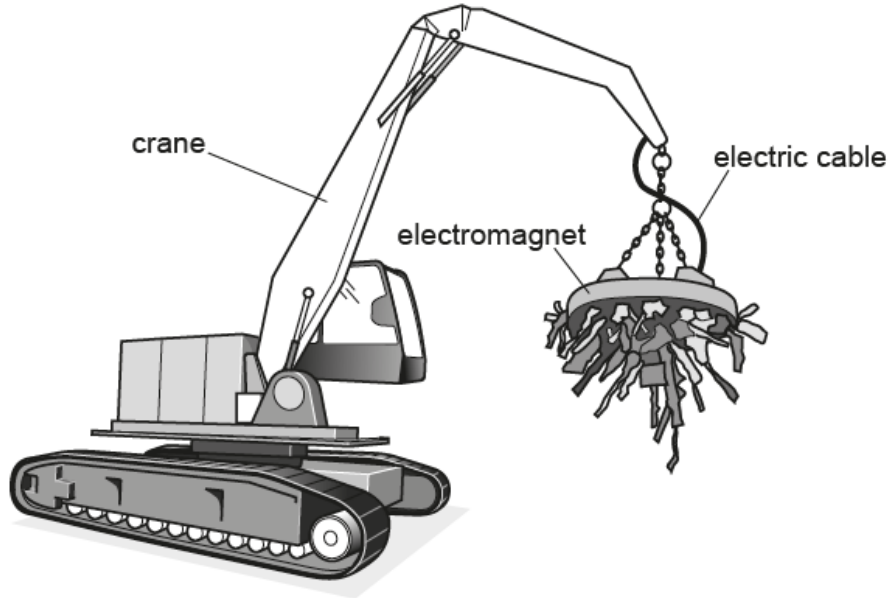


Fig. 6.1

(a) State the name of the metal from which the core of the electromagnet is made.

..... [1]

(b) The electromagnet is powered by a 220 V d.c. (direct current) supply.

The electromagnet is switched on and the current in the circuit is 39 A.

(i) Calculate the power transferred to the electromagnet.

power = [2]

(ii) The d.c. supply is a set of batteries.

The batteries power the magnet for 4.5 hours before they need to be replaced.

Calculate the charge driven around the complete circuit in this time.

charge = [3]

(c) On a very cold morning, when the electromagnet is first switched on, the current is greater than 39A before decreasing to the usual value.

Explain why the current is initially greater than 39A.

.....
..... [1]

[Total: 7]

8. Nov/2022/Paper_22/No.6

The primary coil of a transformer is connected to the mains supply. The voltage of the a.c. mains supply is 240V.

Fig. 6.1 is a diagram of the arrangement.

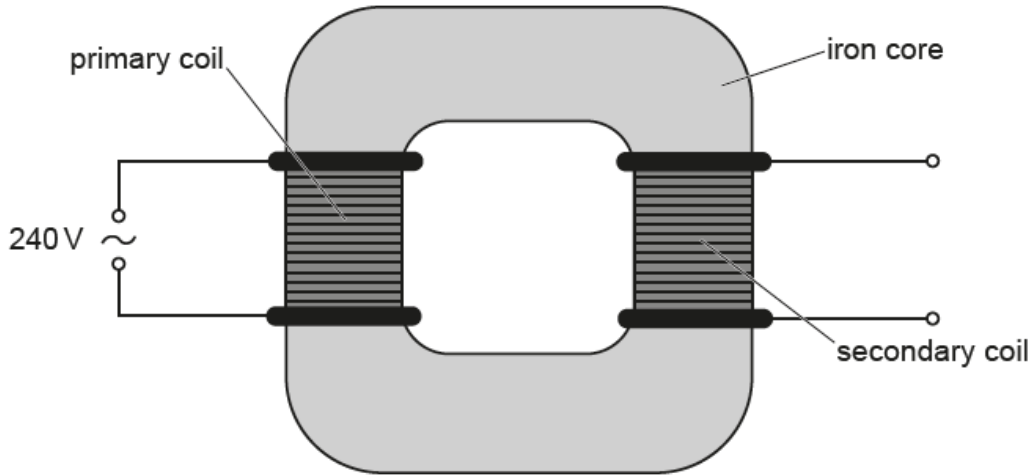


Fig. 6.1

(a) Explain why a voltage is produced in the secondary coil.

.....
.....
.....
..... [3]

(b) There are 5600 turns on the primary coil of the transformer and 350 turns on the secondary coil.

(i) Calculate the output voltage of the transformer.

output voltage = [2]

- (ii) The output of the transformer is connected to a 90W filament lamp which operates at normal brightness.

Calculate the current in the lamp.

current = [2]

[Total: 7]