

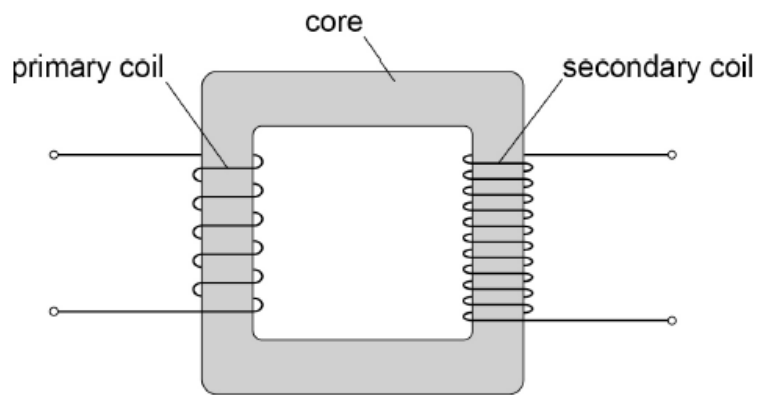
AQA – Magnetic fields – 2022 A2 Physics P2

1. June /2022/Paper_7408/2/No.5

0 5

Figure 7 shows a transformer.

Figure 7



0 5 . 1

Explain the functions of the core and the secondary coil.

[3 marks]

core _____

secondary coil _____

0 5 . 2

Figure 8 shows a cross-section through the transformer core. Thin iron sheets are separated by material **M**.

Explain how the efficiency of the transformer is increased by constructing the core in this way.

[3 marks]

Figure 8

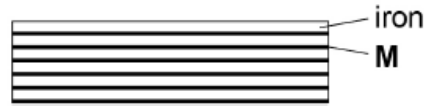
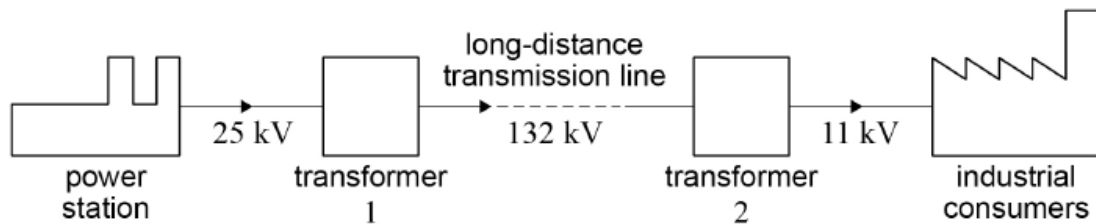


Figure 9 shows a schematic diagram of a power transmission system.

Figure 9



0 5 . 3

Voltages between 33 kV and 400 kV are used for long-distance transmission.

Suggest why engineers have chosen 132 kV for this system.

[2 marks]

0 5 . 4

The industrial consumers use 72 MW of power.
Transformers 1 and 2 each have an efficiency of 98% and the transmission line has an efficiency of 94%.

Calculate the current in the 25 kV line from the power station.

[3 marks]

current = _____ A

2. June /2022/Paper_ 7408/2/No.14

When an electron moves at a speed v perpendicular to a uniform magnetic field of flux density B , the radius of its path is R .

A second electron moves at a speed $\frac{v}{2}$ perpendicular to a uniform magnetic field of flux density $4B$.

What is the radius of the path of the second electron?

[1 mark]

A $\frac{R}{8}$

B $\frac{R}{4}$

C $2R$

D $8R$

3. June /2022/Paper_ 7408/2/No.22

A horizontal wire of length 0.25 m carrying a current of 3.0 A is perpendicular to a magnetic field. The mass of the wire is 3.0×10^{-3} kg and the weight of the wire is supported in equilibrium by the magnetic field.

What is the flux density of the magnetic field?

[1 mark]

A 2.6 T

B 3.9×10^{-2} T

C 2.2×10^{-2} T

D 4.0×10^{-3} T

4. June /2022/Paper_ 7408/2/No.23

A coil is rotated at frequency f in a uniform magnetic field.

The magnetic flux linking the coil is a maximum at time t_1 and the emf induced in the coil is a maximum at time t_2 .

What is the smallest value of $t_1 - t_2$?

[1 mark]

A 0

B $\frac{1}{4f}$

C $\frac{1}{2f}$

D $\frac{3}{4f}$

5. June /2022/Paper_ 7408/2/No.24

Power P is dissipated in a resistor of resistance R carrying a direct current I .

A second resistor of resistance $2R$ carries an alternating current with peak value I .

What is the power dissipated in the second resistor?

[1 mark]

A $\sqrt{2}P$

B P

C $2P$

D $4P$