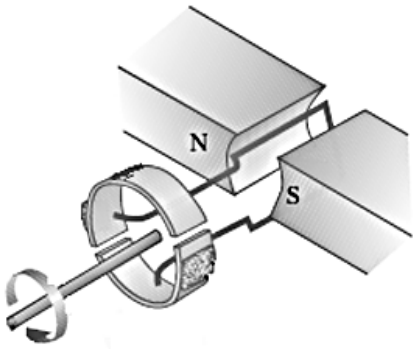
Electrodynamics: Exam Revision Tracker

Attempt #1		Attempt #2		Attempt #3		Attempt #4		Attempt #5	
Total	Score	Total	Score	Total	Score	Total	Score	Total	Score
11		11		9		12		12	
Percentage =		Percentage =		Percentage =		Percentage =		Percentage =	

Electrodynamics: Attempt #1

Total = 11 Marks

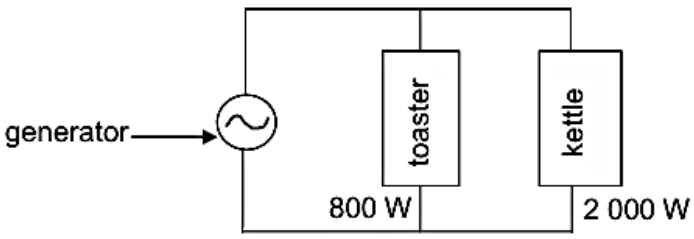
1. A generator is shown below. Assume that the coil is in a vertical position.



1.1 Is the generator above AC or DC? Give a reason for the answer. (2)

1.2 Sketch an induced emf versus time graph for ONE complete rotation of the coil. (The coil starts turning from the vertical position.) (2)

2. An AC generator is operating at a maximum emf of 340 V. It is connected across a toaster and a kettle, as shown in the diagram below.



The toaster is rated at 800 W, while the kettle is rated at 2 000 W. Both are working under optimal conditions.

Calculate the:

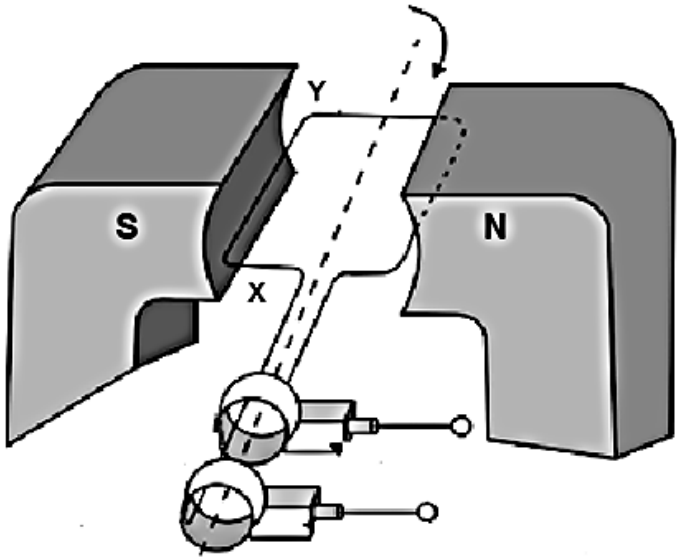
2.1 rms current passing through the toaster (3)

2.2 Total rms current delivered by the generator (4)

Electrodynamics: Attempt #2 ⚡

Total = 11 Marks

1. In the simplified AC generator below, the coil is rotated clockwise.



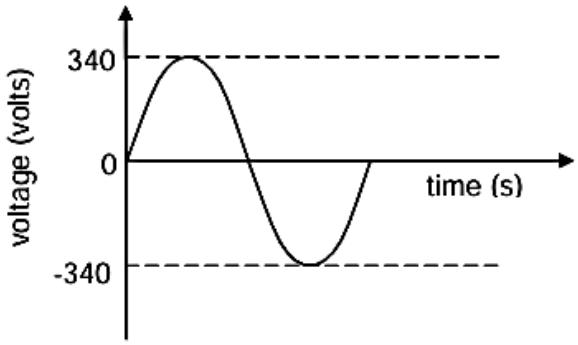
1.1 In which direction does the induced current flow in the coil?

Choose from: **X to Y** or **Y to X**. (1)

1.2 On which principle or law is the working of the generator based? (1)

1.3 State the energy conversion that takes place while the generator is in operation. (2)

2. The voltage output for an AC generator is shown below.



2.1 Write down the maximum (peak) output voltage of the generator. (1)

A stove is connected to the generator above, and delivers an average power of 1 600 W.

2.2 Calculate the rms voltage delivered to the stove. (3)

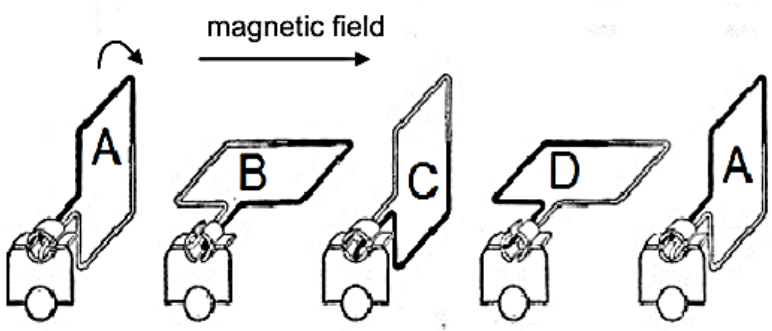
2.3 Calculate the resistance of the stove. (3)

Electrodynamics: Attempt #3 ⚡

Total = 9 Marks

1. The diagram below shows different positions (**ABCDA**) of the coil in a **DC** generator for a complete revolution. The coil is rotated clockwise at a constant speed in a uniform magnetic field.

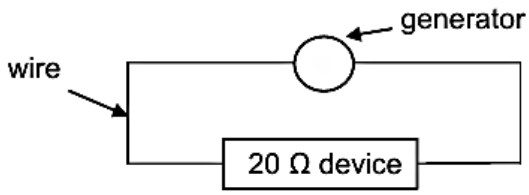
The direction of the magnetic field is shown in the diagram below.



1.1 Write down the energy conversion that takes place during the operation of the DC generator. (1)

1.2 Sketch a graph to show how the induced emf of the generator varies with time. Clearly indicate positions **A**, **B**, **C**, **D** and **A** on the graph. (2)

2. A small AC generator, providing an rms voltage of 25 V, is connected across a device with a resistance of 20 Ω. The wires connecting the generator to the device have a total resistance of 0,5 Ω. Refer to the diagram below.



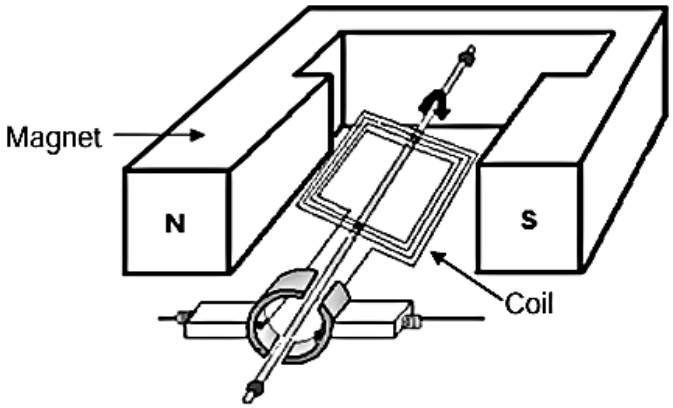
2.1 Write down the total resistance of the circuit. (1)

2.2 Calculate the average power delivered to the *device*. (5)

Electrodynamics: Attempt #4 ⚡

Total = 12 Marks

1. A simplified diagram of an electric generator is shown below. When the coil is rotated with a constant speed, an emf is induced in the coil.



1.1 Is this an AC generator or a DC generator? (1)

1.2 Briefly explain how an emf is generated in the coil when the coil is rotated by referring to the principle of electromagnetic induction. (2)

1.3 Draw a sketch graph of the output voltage versus time for this generator. Show ONE complete cycle. (2)

2. A 200 Ω resistor is connected to a DC voltage supply, as shown in diagram **A**. The energy dissipated in the resistor in 10 s is 500 J.

The same resistor is now connected to an AC source (diagram **B**) and 500 J of energy is also dissipated in the resistor in 10 s.

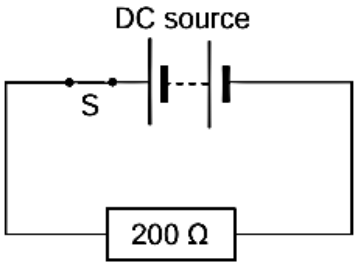


Diagram **A**

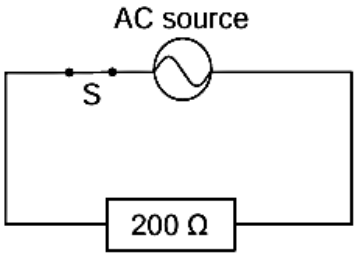


Diagram **B**

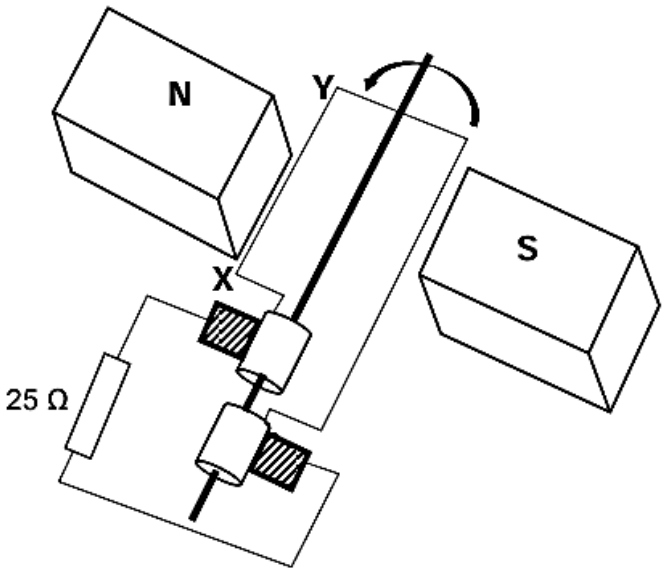
2.1 Define the term *rms voltage* of an AC source. (2)

2.2 Calculate the maximum (peak) voltage of the AC source. (5)

Electrodynamics: Attempt #5 ⚡

Total = 12 Marks

A simplified diagram of an AC generator connected to a 25 Ω resistor is shown below. The coil rotates anticlockwise.

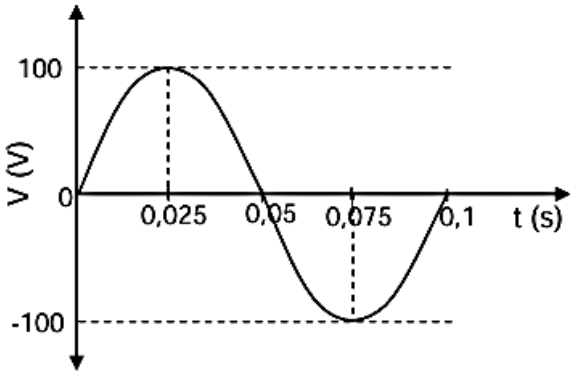


1. Name the component that distinguishes this generator from a DC generator. (1)

2. In which direction will the induced current flow in section **XY** of the coil?

Choose from **X to Y** OR **Y to X**. (2)

The graph below shows the output voltage of the generator for one cycle of rotation of the coil.



3. Define the term *rms potential difference*. (2)

4. Calculate the rms current in the circuit. (4)

5. Calculate the average power dissipated in the 25 Ω resistor. (3)