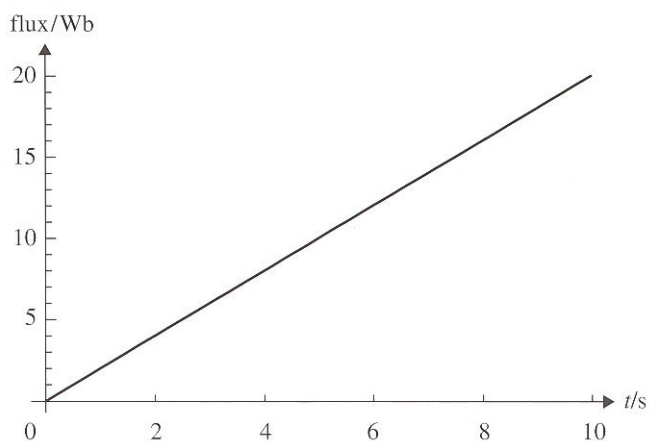


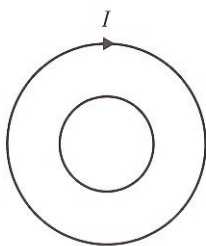
Electromagnetic Induction

1. The flux through a loop as a function of time is given by the graph.



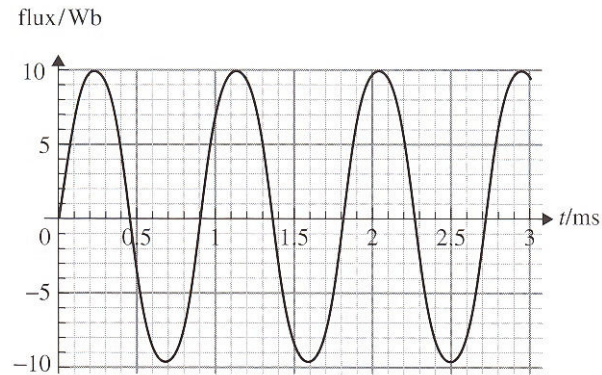
Make a sketch of the emf induced in the loop as a function of time.

2. The figure shows a top view of two solenoids with their axes parallel, one with a smaller diameter so that it fits inside the other. If the bigger solenoid has a current flowing in the clockwise direction (looked at from above) and the current is increasing in magnitude, find the direction of the induced current in the smaller solenoid.



3. A coil of 1000 turns and length 20.0 cm has a smaller coil of diameter 2.0 cm and 200 turns inserted inside it. If the current in the big coil is changing at 150 As^{-1} , find the emf induced in the smaller coil. The magnetic field inside a solenoid is given by: $B = \mu_0 \frac{NI}{L}$
4. A transformer has 500 turns in its primary coil and 200 in its secondary coil.
- If an AC voltage of 220 V and frequency 50 Hz is established in the primary coil, find the voltage and frequency induced in the secondary coil.
 - If the primary current is 6.0 A, find the current in the secondary coil assuming an efficiency of 70%.

5. A 300 MW power station produced electricity at 80 kV, which is then supplied to consumers along cables of total resistance 5.0Ω .
- What percentage of the produced power is lost in the cables?
 - What does the percentage become if the electricity is produced at 100 kV?
6. The figure shows the variation, with time, of the magnetic flux linkage through a loop.



What is the rms value of the emf produced in the loop?