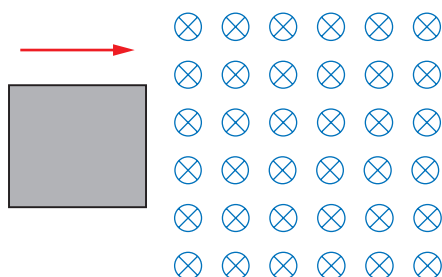


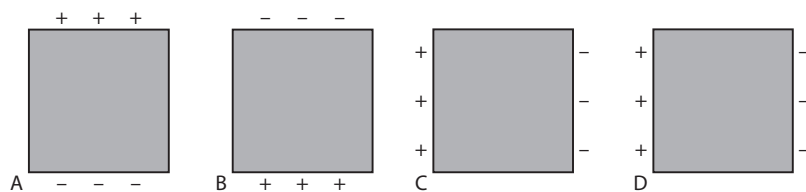
# Self-test questions

## Topic 11

- 1 A solid conducting disc is made to move through a region of a uniform magnetic field directed into the plane of the page.

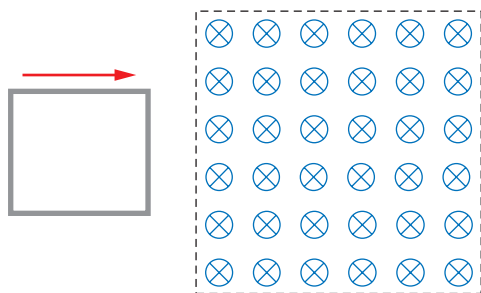


Which diagram shows the correct charge distribution in the disc while the disc is in the region of magnetic field?

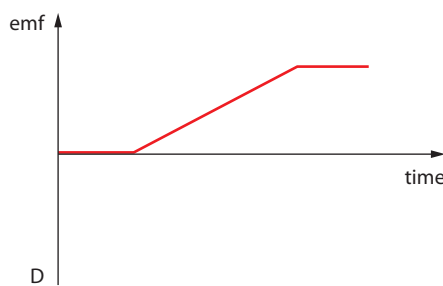
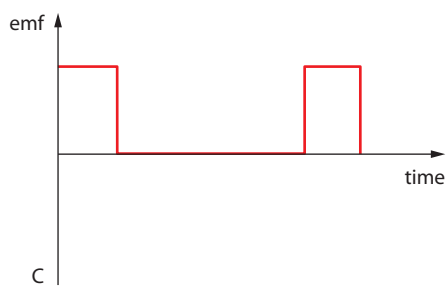
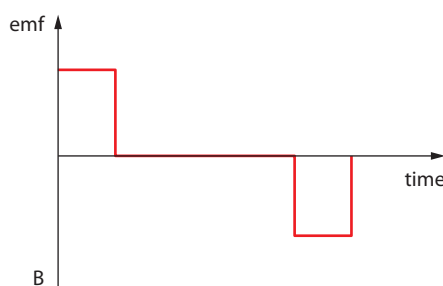
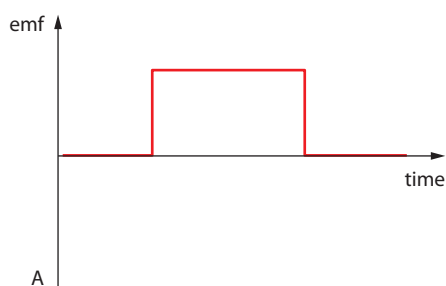


- A  
B  
C  
D

- 2 A loop of wire is moved at constant speed such that it will pass through a region R of magnetic field directed into the plane of the page.



Which graph correctly shows the variation with time of the induced emf in the loop before, during and after the loop enters region R?

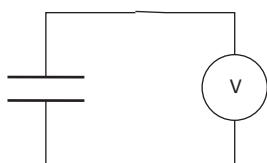


- A
- B
- C
- D

3 A dc current of 5.0 A causes 20 W of power to be dissipated in a resistor. What is the rms value of an ac current that would cause an average power dissipation of 20 W in the same resistor?

- A 2.5 A
- B 5.0 A
- C  $\frac{5.0}{\sqrt{2}}$  A
- D  $5.0\sqrt{2}$  A

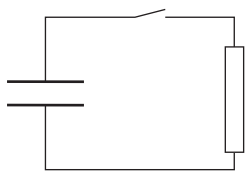
4 A dielectric is placed in between the plates of a charged parallel plate capacitor in vacuum. The capacitor is connected to an ideal voltmeter.



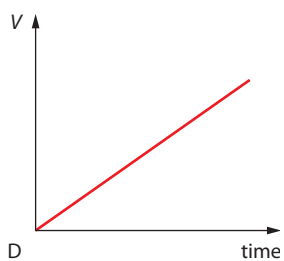
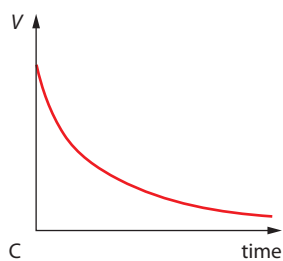
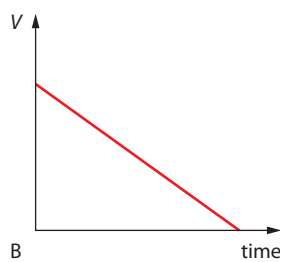
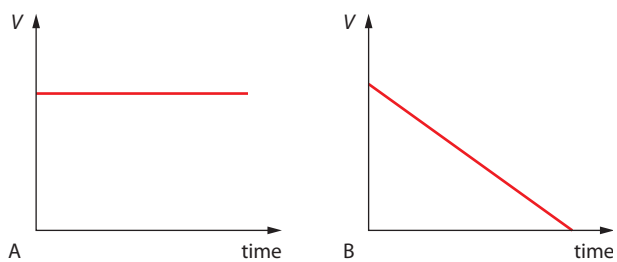
Which of the following best describes the changes in the charge, voltage and capacitance of the capacitor as a result of inserting the dielectric?

	Charge	Voltage	Capacitance
A	stays the same	decreases	stays the same
B	stays the same	decreases	increases
C	increases	increases	stays the same
D	increases	increases	increases

- 5 The diagram shows a circuit that includes a capacitor that is initially fully charged, a switch and a resistor.

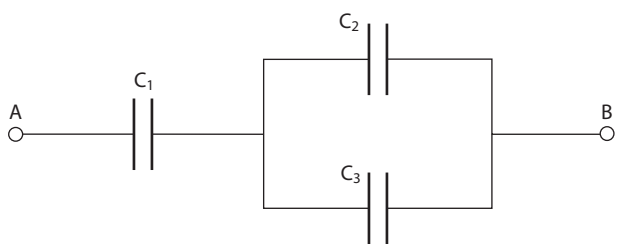


The switch is closed. Which graph best represents the variation with time of the potential difference,  $V$ , between the ends of the resistor?



- A**  
**B**  
**C**  
**D**

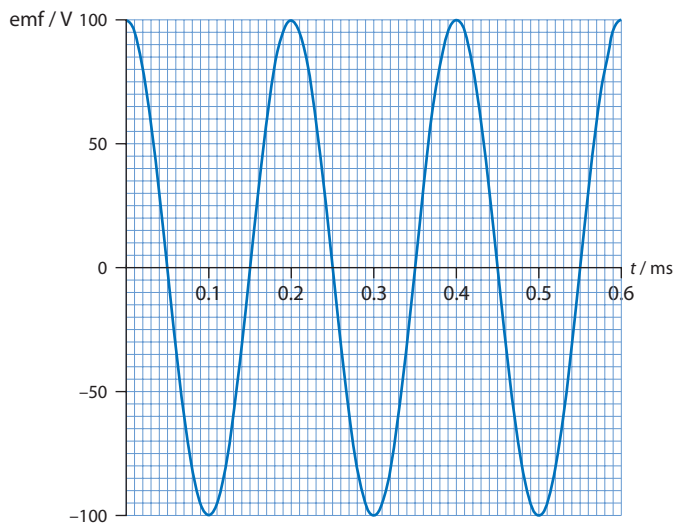
- 6 Each of the capacitors in the figure below has a value of 12 pF.



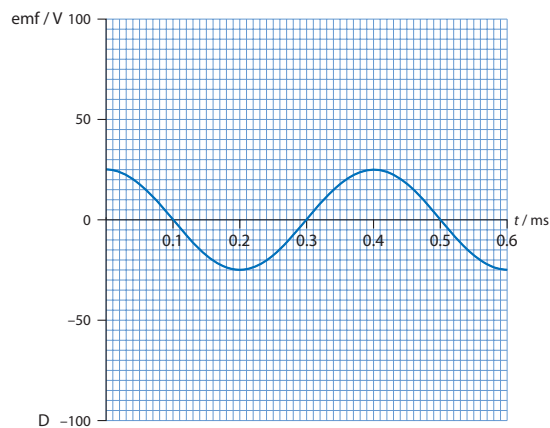
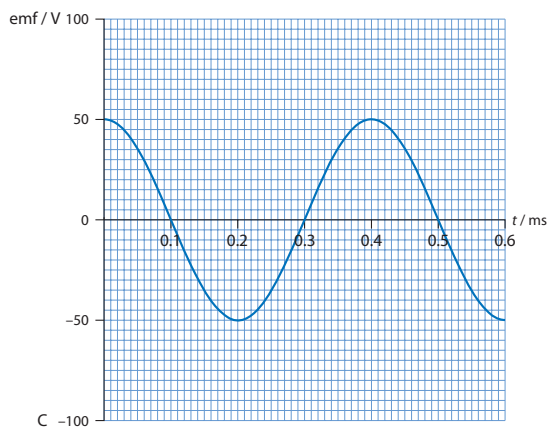
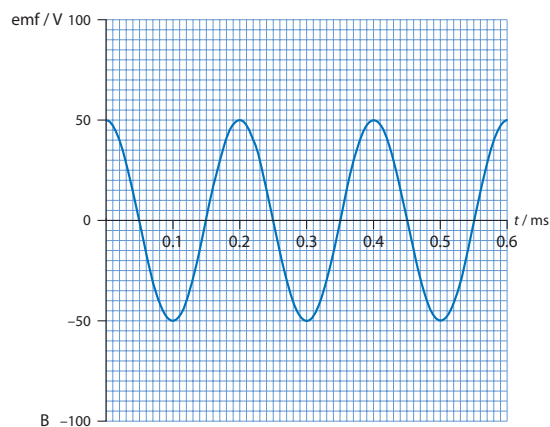
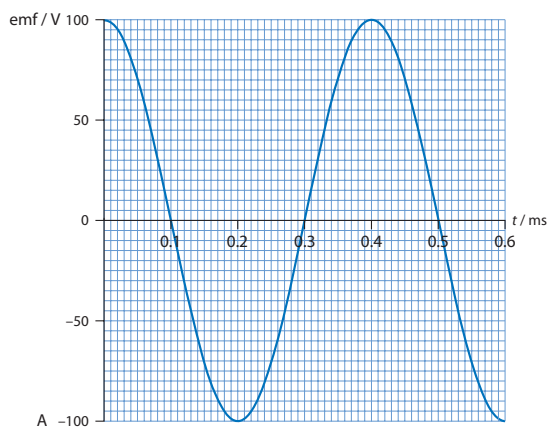
Points A and B are connected to a source of potential difference 3.0 V. What is the charge on one of the plates of capacitor  $C_1$ ?

- A** 12 pC  
**B** 24 pC  
**C** 27 pC  
**D** 54 pC

7 The graph shows the variation with time of the induced emf in a coil rotating in a uniform magnetic field.

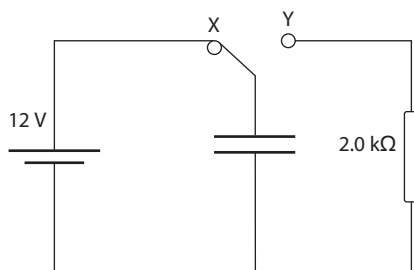


Which graph shows the variation of the induced emf with time when the same coil is rotated in the same magnetic field at half the speed?



- A
- B
- C
- D

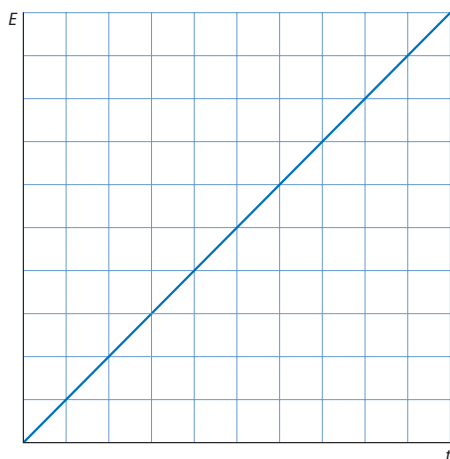
8 In the circuit shown the switch is in position X for a long time so that the capacitor is fully charged.



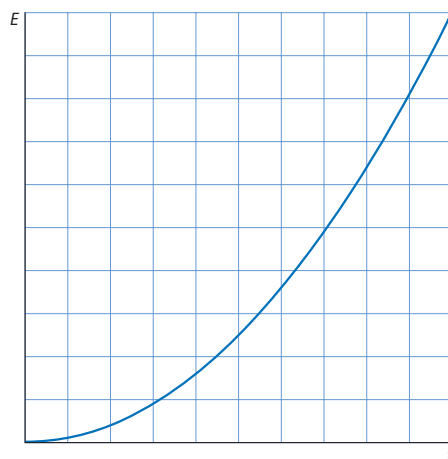
The switch is then moved to position Y. What is the initial current and voltage across the resistor?

	Current/mA	Voltage/V
A	0	0
B	0	12
C	6.0	0
D	6.0	12

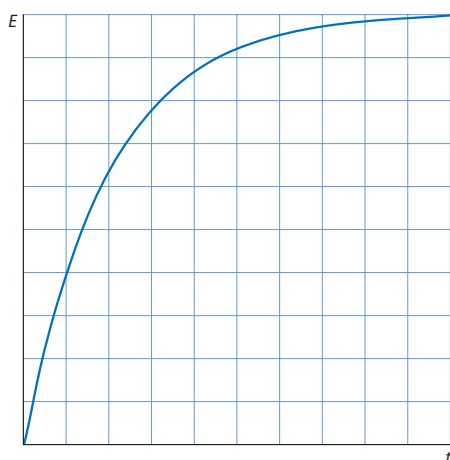
9 A capacitor that is initially uncharged is connected to a source of constant potential difference. Which graph shows how the energy,  $E$ , stored in the capacitor varies with time  $t$ ?



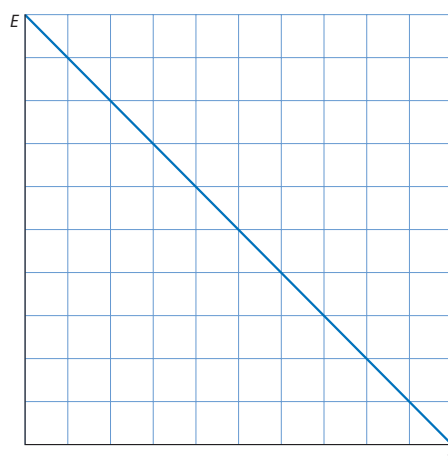
A



B



C



D

- A
- B
- C
- D

- 10 In a diode rectifying bridge circuit the role of the capacitor is to make the current
- A smoother
  - B constant
  - C positive
  - D larger