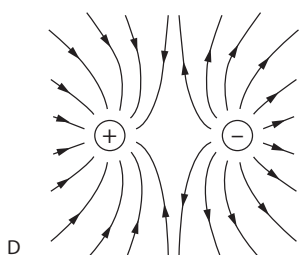
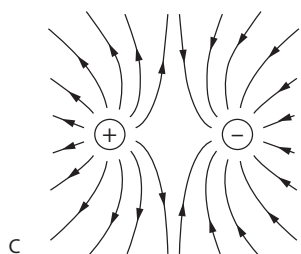
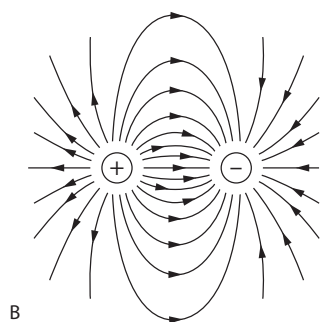
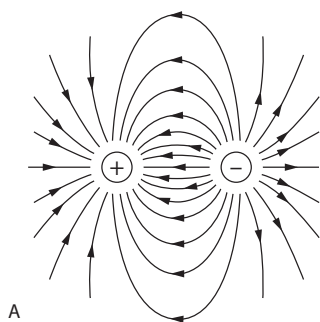


# Self-test questions

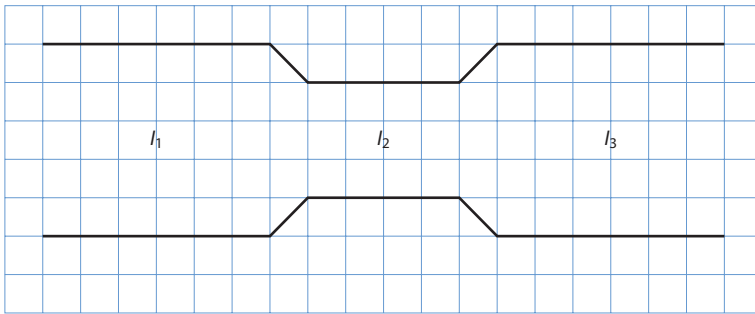
## Topic 5

- 1 Which of the following diagrams correctly represents the electric field around two equal and opposite point charges?



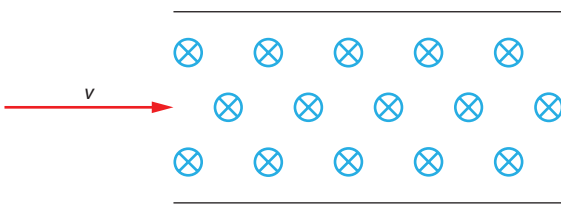
- A  
B  
C  
D
- 2 Two identical particles have mass  $m$  and charge  $q$ . When they are separated by a distance  $d$  the electric force between the particles has magnitude  $F$ . The mass and charge of each particle is doubled and so is the separation. What is the magnitude of the force between the particles now?
- A  $F$   
B  $2F$   
C  $4F$   
D  $8F$

3 Electric current flows in a conductor of variable cross sectional area.



The currents in each section are indicated. Which is the correct relationship between the currents?

- A  $I_1 = I_2 = I_3$
  - B  $I_1 = I_3 > I_2$
  - C  $I_1 = I_3 < I_2$
  - D  $I_1 > I_2 > I_3$
- 4 An electron enters the region in between two oppositely charged parallel plates with speed  $v$ . The electric field in between the plates has magnitude  $E$ . A magnetic field of magnitude  $B$  is directed into the page as shown.



The electron is undeflected. What can be deduced about the magnitude and direction of the electric field?

	Magnitude	Direction
A	$vB$	Down
B	$\frac{B}{v}$	Down
C	$vB$	Up
D	$\frac{B}{v}$	Up

5 The diagram shows three wires carrying equal currents.

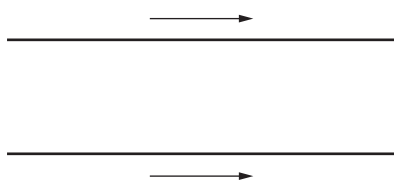


What is the direction of the force on the middle wire?



- A
- B
- C
- D

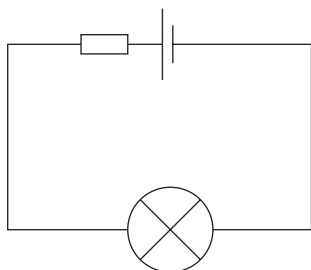
- 6 Two parallel wires have unequal currents in the same direction. Each wire produces a magnetic field at the position of the other wire.



Which of the following is correct about the magnetic forces on 1 m of each wire and the magnetic fields they produce?

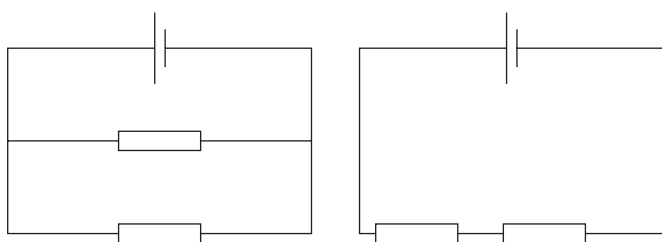
	<b>Forces</b>	<b>Magnetic fields</b>
<b>A</b>	equal	equal
<b>B</b>	equal	unequal
<b>C</b>	unequal	equal
<b>D</b>	unequal	unequal

- 7 A cell with a non-negligible internal resistance is connected to a lamp.



The current in the circuit is 3.0 A. The power dissipated in the lamp is 12 W and that in the internal resistance is 6.0 W. What is the emf of the cell?

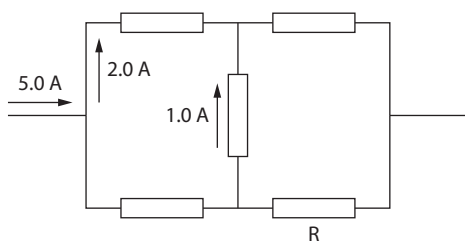
- A** 2.0 V  
**B** 3.0 V  
**C** 4.0 V  
**D** 6.0 V
- 8 In the circuit below the cells have negligible internal resistances and identical emf. The resistances are identical.



What is the ratio of the total power dissipated in the left circuit to that in the right?

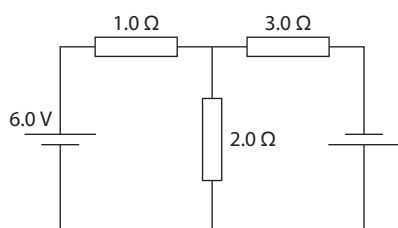
- A**  $\frac{1}{4}$   
**B**  $\frac{1}{2}$   
**C** 2  
**D** 4

9 What is the current through resistor R?



- A 1.0 A
- B 2.0 A
- C 3.0 A
- D 4.0 A

10 In the circuit below the cells have negligible internal resistance. The current through the  $2.0 \Omega$  resistor is zero.



What is the emf of the cell to the right?

- A 2.0 V
- B 3.0 V
- C 6.0 V
- D 18 V