

# Multiple-choice test

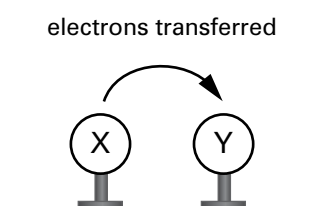
## Block 4: Supplement

Click on the correct answer to each question.

- 1 Which of the following is **not** a method of demagnetising a permanent magnet?
- A heating to a high temperature
  - B cooling to a low temperature
  - C placing in a coil with an a.c. current in it
  - D hammering repeatedly
- 2 Which row in the table gives correct units for both charge and current?

	Unit of charge	Unit of current
A	coulomb (C)	ampere per second (A/s)
B	ampere second (A s)	ampere (A)
C	ampere per second (A/s)	ampere (A)
D	coulomb (C)	ampere second (A s)

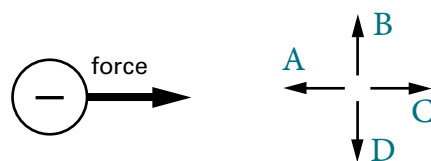
- 3 The diagram shows two objects X and Y that have been rubbed together. Electrons have been transferred from X to Y.



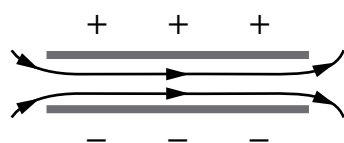
Which row in the table shows their charges correctly?

	Charge on X	Charge on Y
A	negative	negative
B	positive	negative
C	negative	positive
D	positive	positive

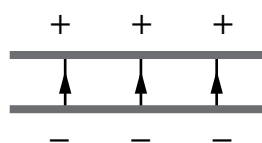
- 4 The diagram shows the force on an object with a negative charge when it is placed in a uniform electric field. Which arrow shows the direction of the electric field?



- 5 Which diagram shows correctly the pattern of the electric field between two metal plates with opposite electric charges?



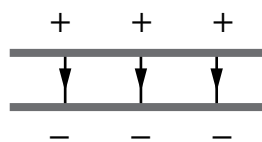
A



B



C



D

- 6 Here is a brief description of how a metal sphere can be charged by induction.

A positively charged rod is held close to the sphere. The sphere is briefly connected to earth. Then the charged rod is removed.

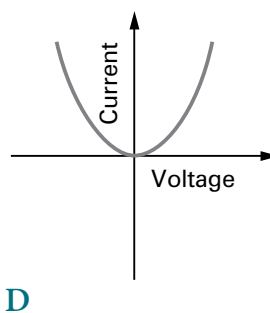
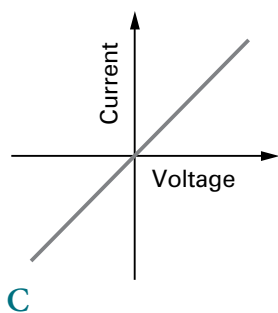
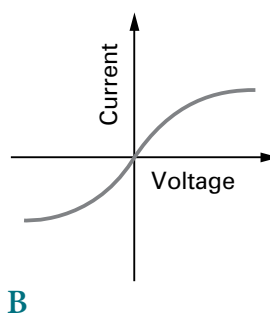
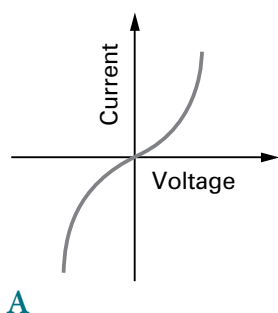
Which row in the table correctly shows the signs of the charge that flows to earth and the charge of the sphere once it has been charged.

	Charge that flows to earth	Charge on sphere
A	negative	negative
B	positive	negative
C	negative	positive
D	positive	positive

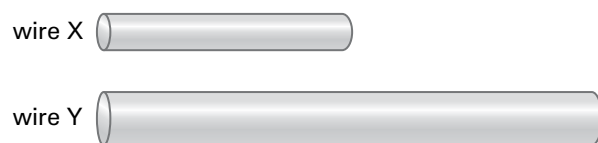
- 7 Which of the following statements about electrical conduction is **not** correct?

- A A metal contains many free electrons, which can move about inside the metal.
- B Plastic is an electrical insulator because it contains no electrons.
- C A potential difference causes electrons to move through a metal.
- D The direction of conventional current is opposite to the direction of electron flow in a metal.

- 8 The current at a point in a circuit is a measure of the rate of flow of charge past the point. What is the current, in amps, if 300 C passes in 2 minutes?
- A 2.5 amps  
 B 10.0 amps  
 C 150 amps  
 D 600 amps
- 9 Which equation gives the correct relationship between the volt (V), the joule (J) and the coulomb (C)?
- A  $1 \text{ J} = 1 \text{ C/V}$   
 B  $1 \text{ J} = 1 \text{ V/C}$   
 C  $1 \text{ C} = 1 \text{ V/J}$   
 D  $1 \text{ V} = 1 \text{ J/C}$
- 10 Which graph shows the current–voltage characteristic for a filament lamp?



- 11 Wire X has a resistance of  $20\ \Omega$ . Wire Y is twice as long as X and it has twice the cross-sectional area.

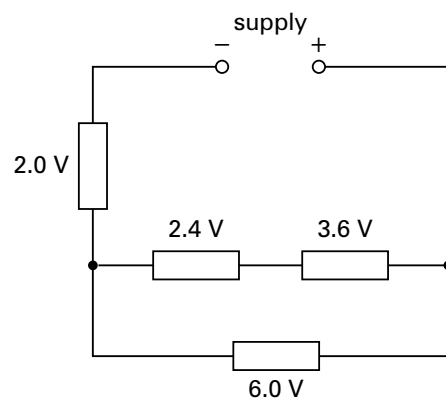


What is the resistance of Y, in  $\Omega$ ?

- A  $5\ \Omega$   
 B  $10\ \Omega$   
 C  $20\ \Omega$   
 D  $80\ \Omega$
- 12 When an electric motor is connected to a  $15\ \text{V}$  supply, the current in it is  $3.0\ \text{A}$ . Which row in the table correctly shows the power dissipated in the motor and the energy transferred each minute?

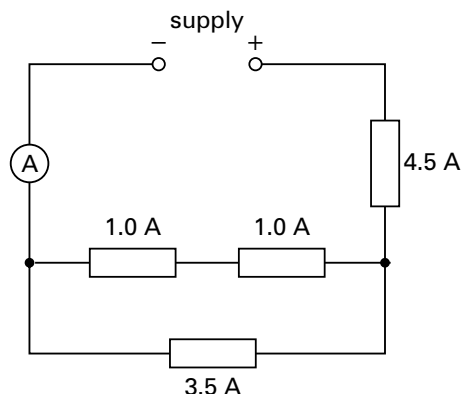
	Power / W	Energy transferred per minute / J
A	5.0	5.0
B	5.0	300.0
C	45.0	45.0
D	45.0	2700.0

- 13 In the circuit, the p.d. across each resistor is shown. What is the p.d., in V, across the supply?

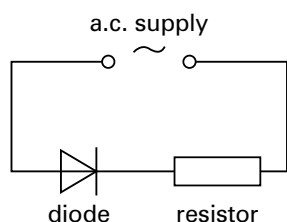


- A  $6.0\ \text{V}$   
 B  $8.0\ \text{V}$   
 C  $14.0\ \text{V}$   
 D  $16.0\ \text{V}$

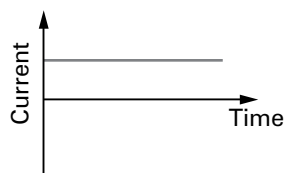
- 14 In the circuit, the current in each resistor is shown. What is the current, in A, measured by the ammeter?



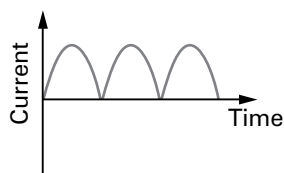
- A 0 A  
 B 4.5 A  
 C 9.0 A  
 D 10.0 A
- 15 Two resistors, one of resistance  $24\ \Omega$  and the other of resistance  $12\ \Omega$ , are connected in parallel with each other. What is their combined resistance, in  $\Omega$ ?
- A  $6\ \Omega$   
 B  $8\ \Omega$   
 C  $24\ \Omega$   
 D  $36\ \Omega$
- 16 In the circuit, a resistor and a diode are connected in series with an a.c. supply.



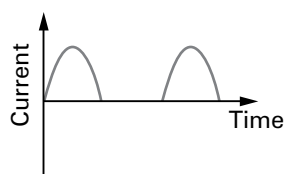
Which graph shows how the current in the resistor will vary?



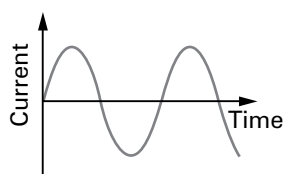
A



B



C



D

17 Which row in the table shows two components that could be used in a circuit that acts as a temperature-sensitive switch?

Circuit components		
<b>A</b>	light-dependent resistor	thermistor
<b>B</b>	light-dependent resistor	relay
<b>C</b>	relay	thermistor
<b>D</b>	thermistor	diode

18 Which logic gate is represented by the symbol shown?



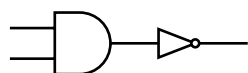
- A AND gate
- B OR gate
- C NAND gate
- D NOR gate

19 The action of which logic gate is represented by the following truth table?

Input 1	Input 2	Output
OFF	OFF	OFF
OFF	ON	ON
ON	OFF	ON
ON	ON	ON

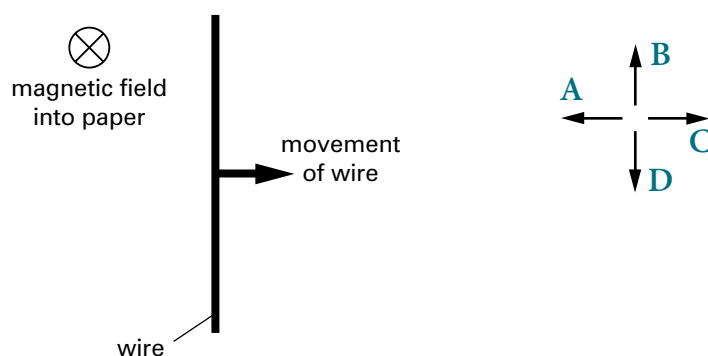
- A AND gate
- B OR gate
- C NAND gate
- D NOR gate

20 The diagram shows two logic gates connected together. Which single logic gate would have the same effect as this combination?



- A AND gate
- B OR gate
- C NAND gate
- D NOR gate

- 21 The diagram shows a straight wire moving across a uniform magnetic field. The field is directed perpendicularly into the paper.



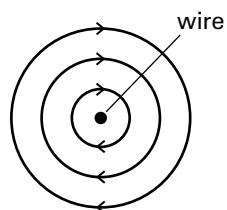
Which arrow shows the direction of the induced current in the wire?

- 22 The primary coil of a transformer is connected to a 20 V alternating supply. A current of 0.5 A flows in the primary coil. An ammeter shows that there is a current of 2.5 A in the secondary coil. Which row in the table shows correctly the type of transformer and the p.d. across the secondary coil? (You can assume that the transformer is 100% efficient.)

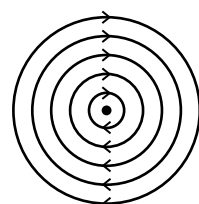
	Type of transformer	P.d. across secondary coil / V
A	step-up	4.0
B	step-up	80.0
C	step-down	4.0
D	step-down	80.0

- 23 A transformer is used to increase the voltage of the electricity supply for transmission on the grid. This reduces the energy losses in the cables of the grid. Which of the following gives the correct explanation for this?
- A The high-voltage cables can be held high above the ground, so less energy can escape.
  - B The current in the cables will also be increased, so the current lost in the cables is a smaller fraction of the total.
  - C The current in the cables will be less, so there is less energy lost as heat in the cables.
  - D The high voltage means that the resistance of the cables is less, so less energy is wasted in overcoming their resistance.

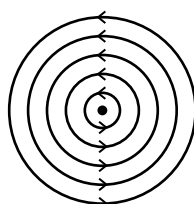
- 24 The first diagram shows a wire directed into the paper. There is a current in the wire, and the circles represent the magnetic field due to the current.



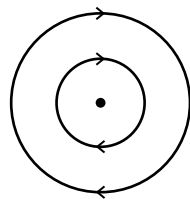
Which one of the four diagrams shows the field when the direction of the current in the wire has been reversed and the current has been increased to a higher value?



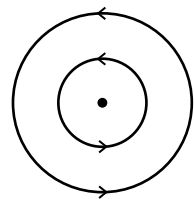
A



B

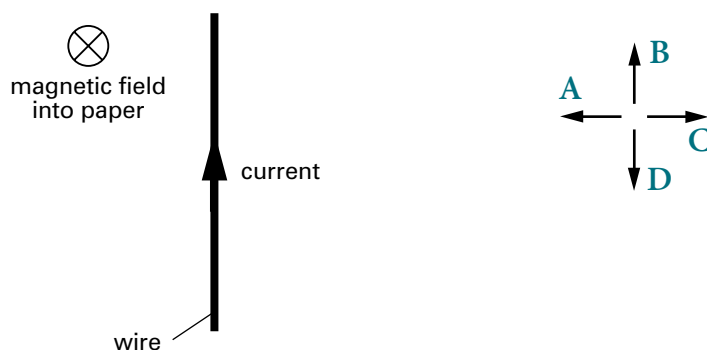


C



D

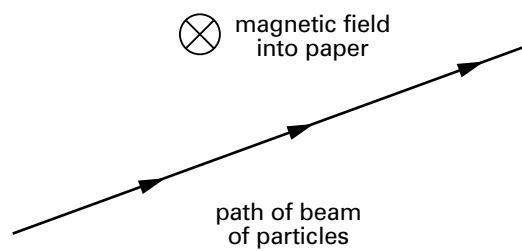
- 25 The diagram shows a straight wire in a uniform magnetic field. The field is directed perpendicularly into the paper. A steady current flows in the wire in the direction shown.



Which arrow shows the direction of the force on the wire?



- 26 The diagram shows the path of a beam of particles in a magnetic field. The field is directed perpendicularly into the paper.



Which of the following statements about the particles is correct?

- A They have a positive charge.
- B They have a negative charge.
- C They have no charge.
- D They are moving at the speed of light.