

A-level Physics

Summer Independent Learning

Y12-13

Task 1 Progression exam focus areas

Task 2 Electricity exam questions

Task 3 Circular motion exam questions

Task 4 Multiple choice questions

Extension

Task 5 Kerboodle chapter questions

Welcome to Y13 A Level Physics, please complete the following tasks ready for your first day back at New College. You can either write on the document electronically, print the document out or write your notes and answers on paper to bring in for your first lesson in September.

You may have to research any knowledge or techniques you cannot immediately recall using common GCSE resources or other tutorials.

Please be aware that you will have an assessment on these topics shortly after beginning your A level Physics course and the knowledge covered is essential to understanding the subsequent content.

Help and resources can be found in a Physics SIL Team that you have been added to.

Task 1

Following feedback on the progression exam, choose two or three areas to develop.

For each area:

- A. Test yourself again (using the 1234s)
- B. Read notes (available on Teams) to fill in any gaps in knowledge
- C. Watch videos from the lessons syllabus (available on Teams)
- D. Create flashcards to help make this knowledge more retrievable.
- E. Test yourself with one of our interim (Oxford) tests

Task 2

Follow the link to Physics and maths Tutor website and work through around 75 marks of questions on electricity.

Task 3

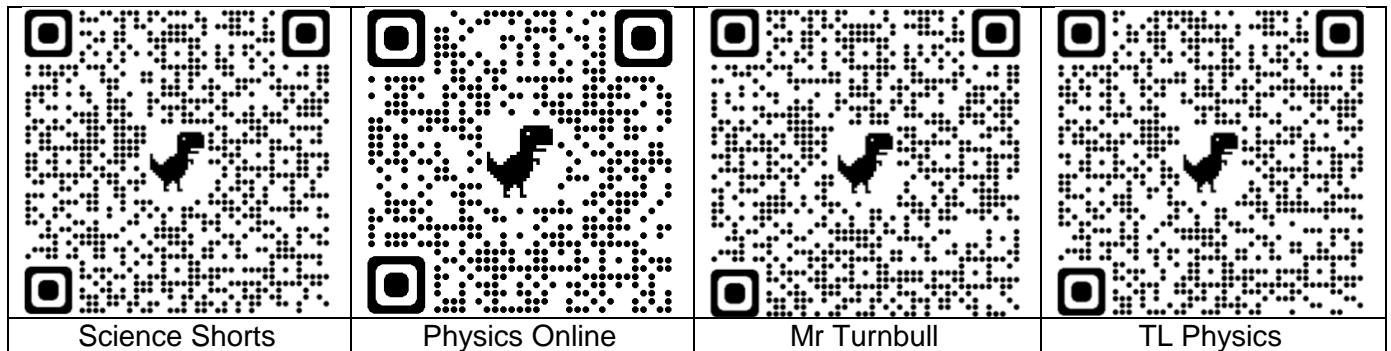
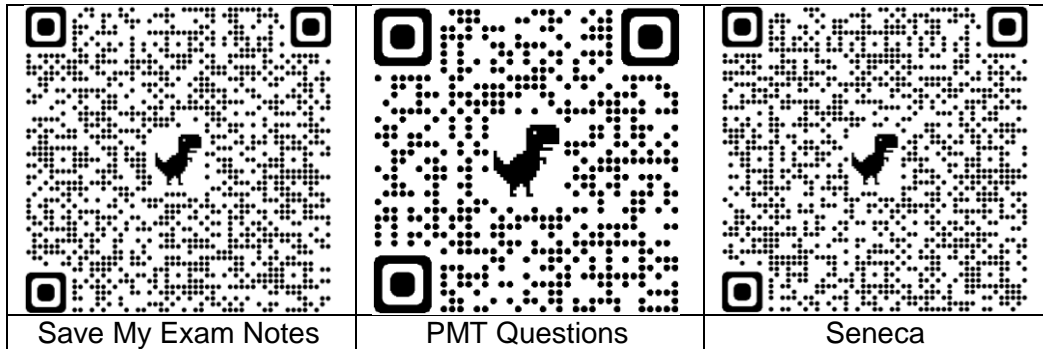
Follow the link to Physics and maths Tutor website and work through around 50 marks of questions on circular motion.

Task 4

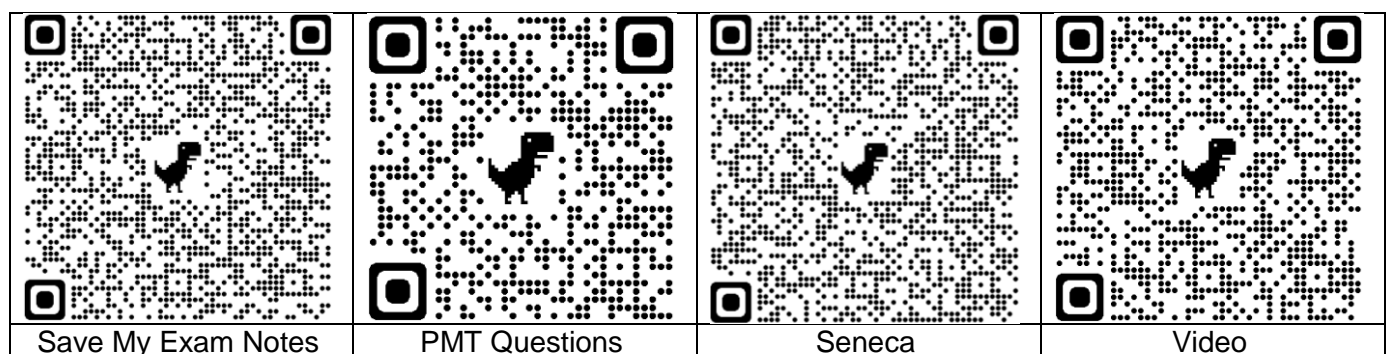
Attempt and mark the attached multiple choice questions on electricity and circular motion (mark schemes at end of document).

Support and Links

Electricity



Circular Motion



Extension

Use the Kerboodle textbook (available in the SIL Team that you are in).

Use the textbook to find the answers to the following

19.1 Internal Energy and Temperature - pages 306 – 309.

- Q1. When does energy transfer between two objects take place?
- Q2. State the two ways to increase the internal energy of an object.
- Q3. What must be happening if the internal energy of an object is constant?
- Q4. Write out the first law of thermodynamics.
- Q5. Describe the movement of molecules in a solid.
- Q6. What happens to the molecules of a solid when temperature increases?
- Q7. What does the energy supplied to melt a solid do to the molecules?
- Q8. Describe the movement of molecules in a liquid.
- Q9. Describe the movement of molecules in a gas.
- Q10. What is the definition of internal energy?
- Q11. If internal energy flows from water to your hand what do we know about their temperatures?
- Q12. When are two objects in thermal equilibrium?
- Q13. What is the lowest possible temperature on the Celsius scale?
- Q14. What are 0 °C and 100 °C on the absolute scale (in kelvin)?
- Q15. What is meant by absolute zero?

19.2 Specific Heat Capacity – pages 310 - 312

- Q1. What is meant by the specific heat capacity of a substance?
- Q2. What is the unit of specific heat capacity?
- Q3. How is the energy needed to change temperature calculated? Define all terms in the equation.
- Q4. What is the assumption when using an inversion tube?
- Q5. Describe or draw the experimental set up used to find the specific heat capacity of a solid.
- Q6. What is the assumption when carrying out this experiment?
- Q7. How is the specific heat capacity of a solid calculated from this set up? Define all terms in the equation.
- Q8. Does the change in temperature need to be calculated in Celsius or kelvin?
- Q9. When finding the specific heat capacity of a liquid what does the electrical energy supply increase the temperature of?
- Q10. If we are given volume flow rate, what else do we need to be given to calculate the flow rate of mass?

19.3 Change of State – pages 313 - 315

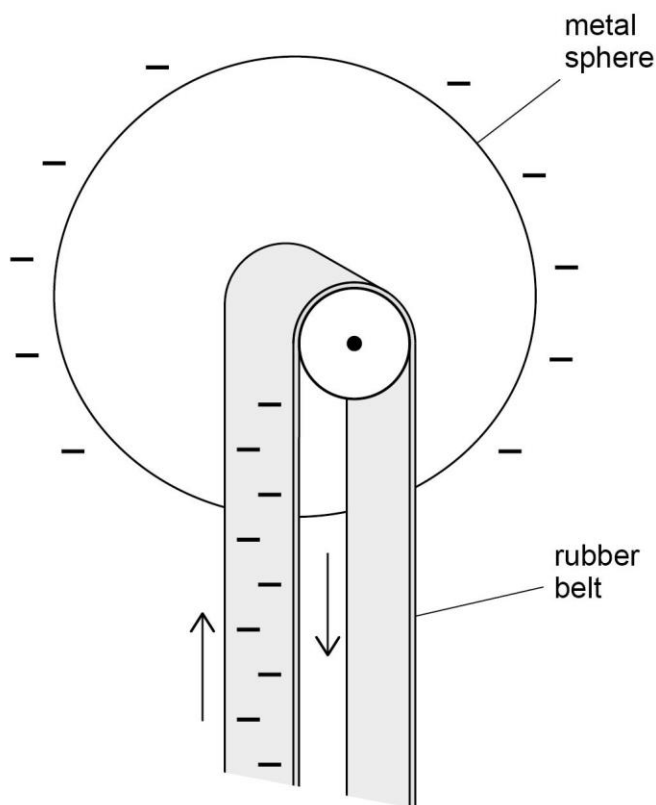
- Q1. What happens when the temperature of a solid increase?
- Q2. What happens when the temperature of a liquid increase?
- Q3. What happens when a solid is heated at its melting point?
- Q4. What does latent mean?
- Q5. What happens when a liquid is heated at its boiling point?
- Q6. Which state changes require energy?

- Q7. Which state changes release energy?
Q8. What is sublimation?
- Q9. Compare the energy required to vaporise a substance with the energy required to melt it.
- Q10. What is meant by the specific latent heat of fusion?
Q11. What is meant by the specific latent heat of vaporisation?
Q12. How is the energy needed to change state calculated? Define all terms in the equation.
Q13. What is the unit of specific latent heat?
Q14. What happens to the temperature of a solid as it melts?
Q15. In a temperature-time graph what is the gradient equal to?

10 Minutes on: 39 Circuit Basics

- Q1.** A rubber belt in an electrostatic machine has a width of 0.1 m and moves with speed 0.4 m s^{-1} .

Each square metre of the belt carries a charge Q coulomb. The charge is removed and transferred to a metal sphere.



What is the charge collected by the sphere each second?

- | | | |
|----------|----------|-----------------------|
| A | $0.016Q$ | <input type="radio"/> |
| B | $0.04Q$ | <input type="radio"/> |
| C | $0.25Q$ | <input type="radio"/> |
| D | $4Q$ | <input type="radio"/> |

(Total 1 mark)

Q2. In a cathode ray tube 7.5×10^{15} electrons strike the screen in 40 s. What current does this represent?

Charge of the electron is 1.6×10^{-19} C.

A 1.3×10^{-16} A

B 5.3×10^{-15} A

C 3.0×10^{-5} A

D 1.2×10^{-3} A

(Total 1 mark)

Q3. The current in a wire is 20 mA.

How many electrons pass a point in the wire in 2 minutes?

A 2.5×10^{17}

B 1.5×10^{19}

C 2.5×10^{20}

D 1.5×10^{22}

(Total 1 mark)

Q4. A gas containing doubly-charged ions flows to give an electric current of 0.64 A

How many ions pass a point in 1.0 minute?

A 2.0×10^{18}

B 4.0×10^{18}

C 1.2×10^{20}

D 2.4×10^{20}

(Total 1 mark)

Q5. Which is equivalent to the ohm?

A $J C^{-2} s^{-1}$

B $J C^{-2} s$

C $J s$

D $J s^{-1}$

(Total 1 mark)

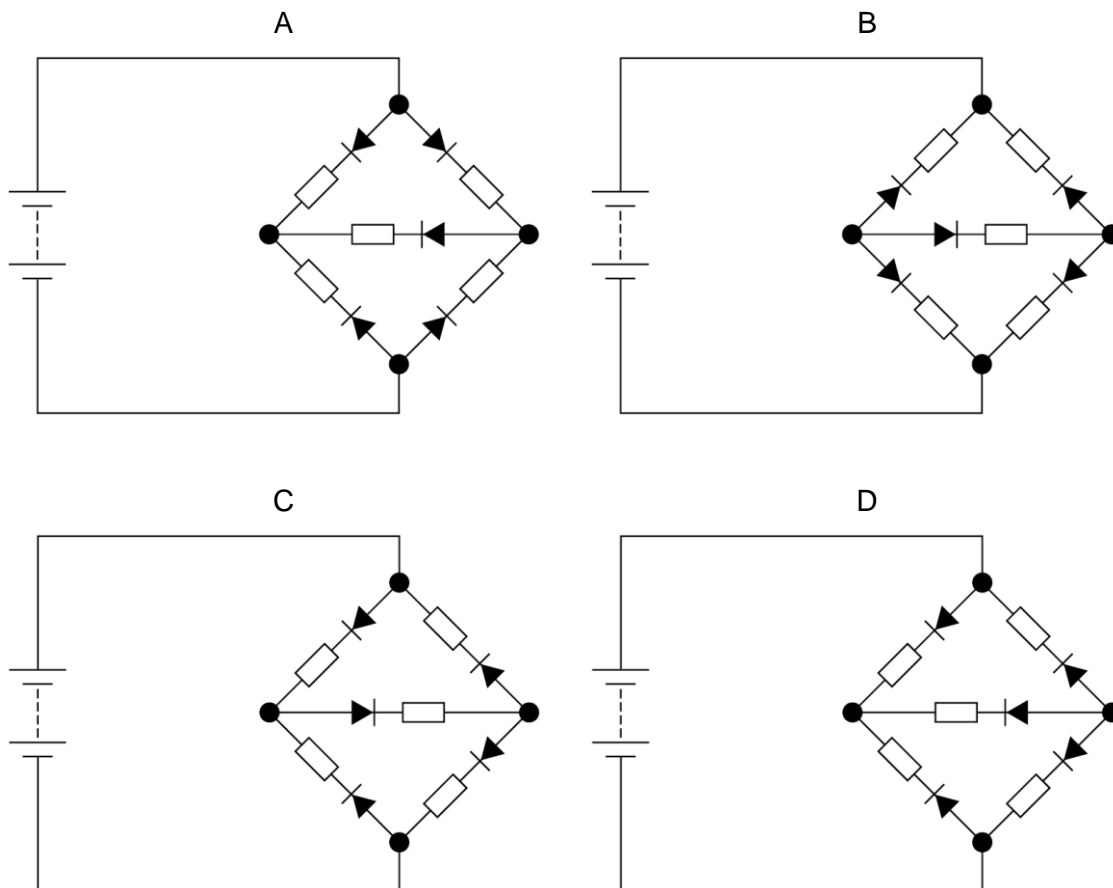
Q6. What is a unit for potential difference?

- A** $A \Omega^{-1}$
- B** $C J^{-1}$
- C** $J A^{-1} s^{-1}$
- D** $W A$

(Total 1 mark)

Q7. The diagrams show a battery connected to networks of ideal diodes and resistors.

In which circuit will a charge flow in the battery?



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

(Total 1 mark)

10 Minutes on: 40 I-V Graphs

Q1. Which row shows the resistances of an ideal ammeter and an ideal voltmeter?

	Ideal ammeter	Ideal voltmeter	
A	infinite	infinite	<input type="radio"/>
B	infinite	zero	<input type="radio"/>
C	zero	infinite	<input type="radio"/>
D	zero	zero	<input type="radio"/>

(Total 1 mark)

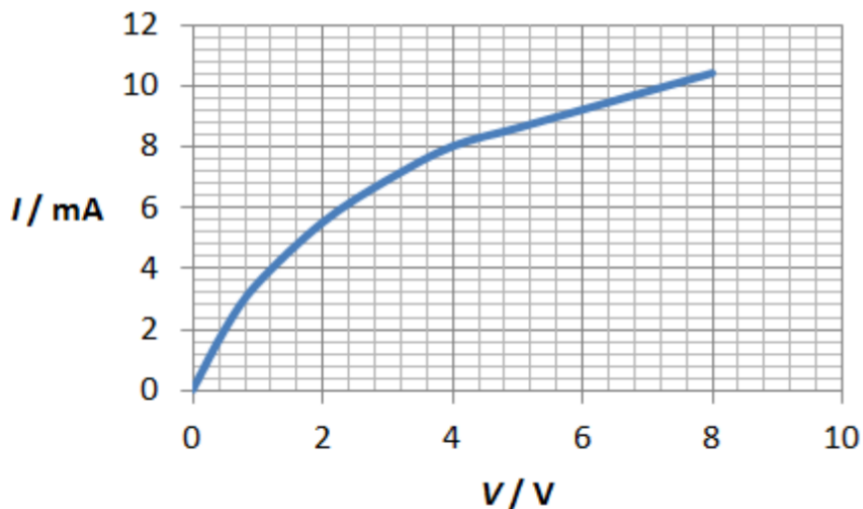
Q2. A voltmeter is used to measure potential difference for a component **X**.

Which row gives the position and ideal resistance for the voltmeter?

	Position	Ideal resistance	
A	in series with X	infinite	<input type="radio"/>
B	in series with X	zero	<input type="radio"/>
C	in parallel with X	infinite	<input type="radio"/>
D	in parallel with X	zero	<input type="radio"/>

(Total 1 mark)

Q3. The graph shows the current–voltage (I – V) characteristics of a filament lamp.

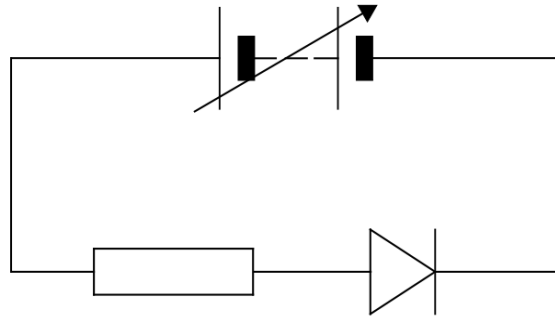


What is the resistance of the filament when the potential difference (pd) across it is 4.0 V?

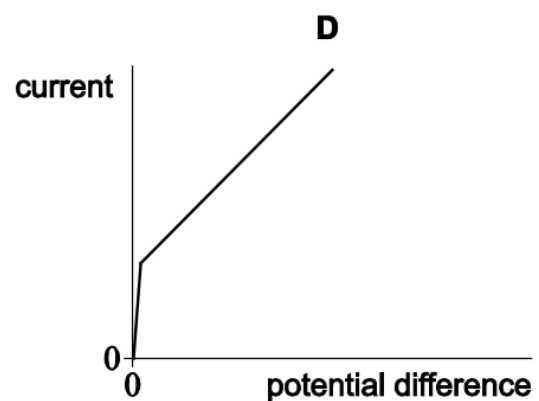
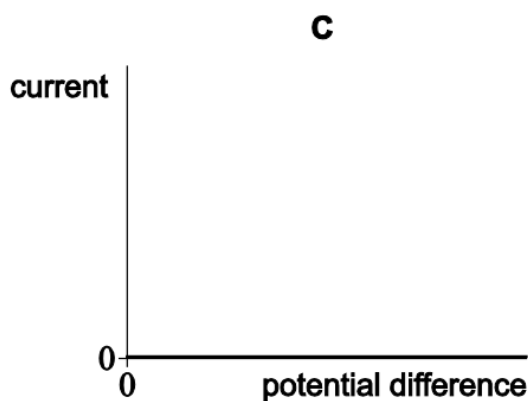
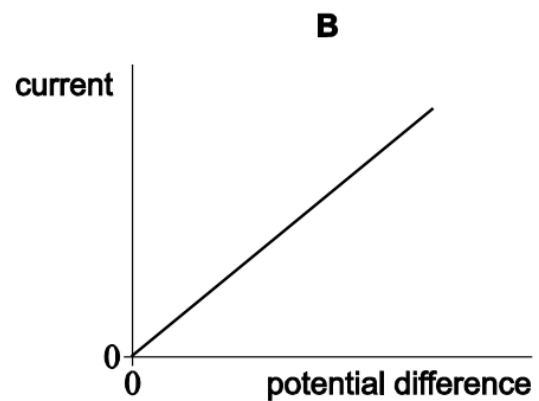
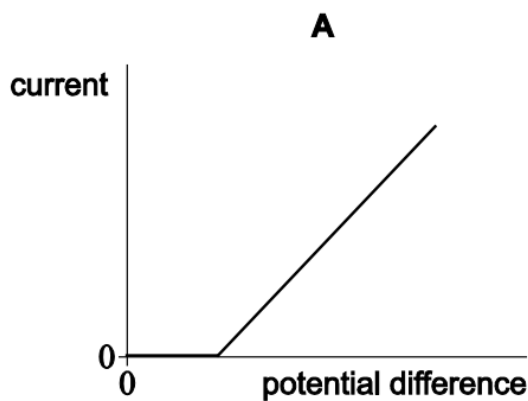
- | | | |
|----------|---------------|--------------------------|
| A | 500 Ω | <input type="checkbox"/> |
| B | 1700 Ω | <input type="checkbox"/> |
| C | 2000 Ω | <input type="checkbox"/> |
| D | 6000 Ω | <input type="checkbox"/> |

(Total 1 mark)

Q4. A resistor and diode are connected in series with a variable power supply as shown in the diagram.



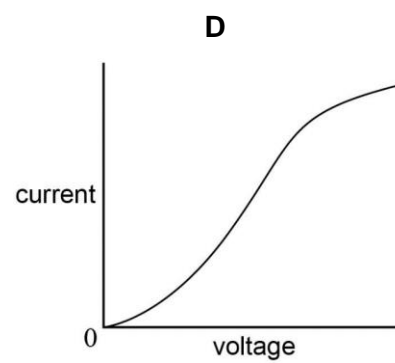
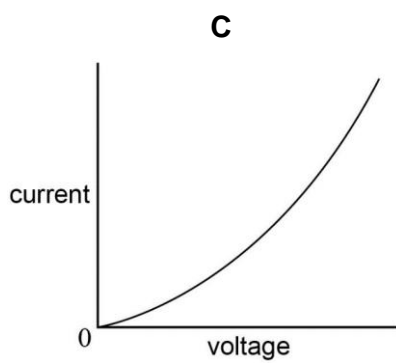
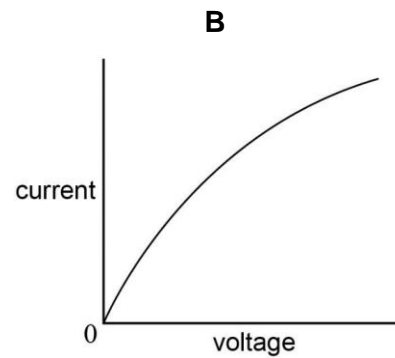
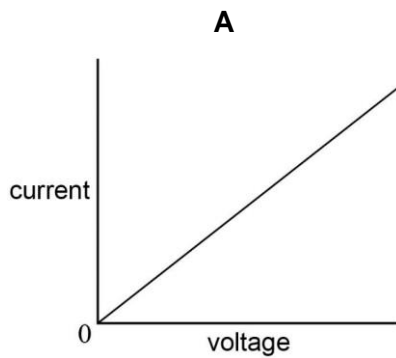
Which best shows the characteristic for the combination of the resistor and diode?



- A
- B
- C
- D

(Total 1 mark)

Q5. Which is the current–voltage characteristic graph for a filament lamp up to its working voltage?



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

(Total 1 mark)

Q6. The table shows corresponding values of potential difference V and current I for four electrical components **A**, **B**, **C** and **D**.

	A	B	C	D
V/V	I/A	I/A	I/A	I/A
0	0.0	0.0	0.0	0.0
2	0.0	0.3	0.4	0.3
4	0.1	0.6	0.8	0.6
6	0.7	0.9	1.2	0.9
8	1.4	1.2	1.6	1.1
10	2.1	1.5	2.0	1.3

Which component is an ohmic conductor with the greatest resistance?

A

B

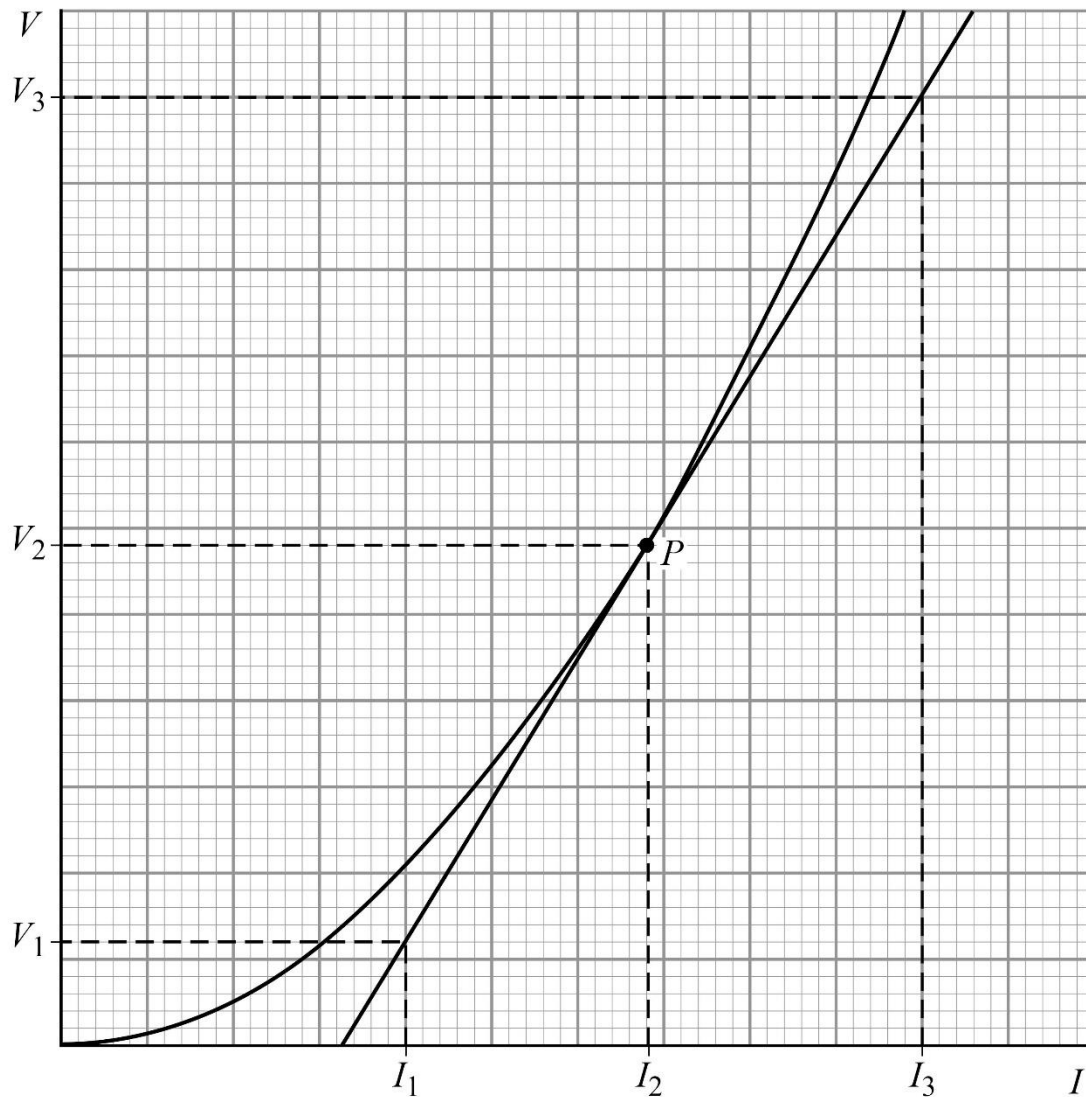
C

D

(Total 1 mark)

Q7. The graph shows how the potential difference V across an electrical component varies with current I in the component.

A tangent has been drawn on the curve at point P for a current of I_2 .



What is the resistance of the electrical component when the current in the component is I_2 ?

- A** $\frac{V_3 - V_1}{2I_2}$
- B** $\frac{V_3 - V_1}{I_3 - I_1}$
- C** $\frac{V_2}{I_2}$
- D** $\frac{2V_2}{I_2 - I_1}$

10 Minutes on: 41 Resistivity

Q1. A resistor with resistance R is made from metal wire of resistivity ρ . The length of the wire is L .

What is the diameter of the wire?

A $\sqrt{\frac{2\rho R}{\pi L}}$

B $\sqrt{\frac{2\rho L}{\pi R}}$

C $2\sqrt{\frac{\rho L}{\pi R}}$

D $2\sqrt{\frac{\rho R}{\pi L}}$

(Total 1 mark)

Q2. A metal wire has a length l and a cross-sectional area A . When a potential difference V is applied to the wire, there is a current I in the wire.

What is the resistivity of the wire?

A $\frac{IA}{Vl}$

B $\frac{VA}{Il}$

C $\frac{Il}{VA}$

D $\frac{Vl}{IA}$

(Total 1 mark)

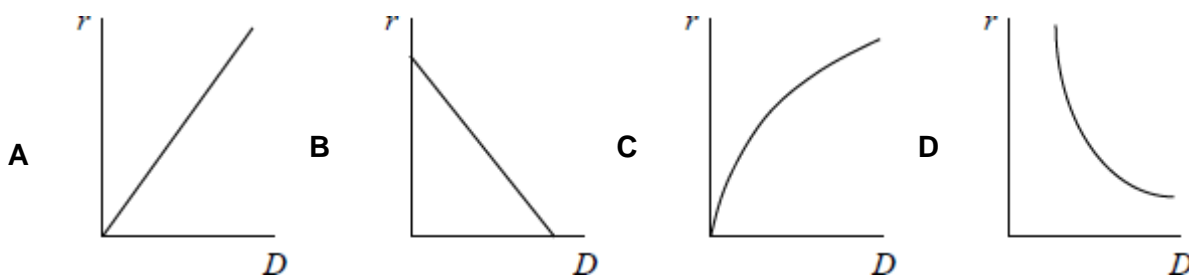
Q3. A wire has a resistance R .

What is the resistance when both the length and radius of the wire are doubled?

- | | | |
|----------|---------------|--------------------------|
| A | $\frac{R}{4}$ | <input type="checkbox"/> |
| B | $\frac{R}{2}$ | <input type="checkbox"/> |
| C | $2R$ | <input type="checkbox"/> |
| D | $4R$ | <input type="checkbox"/> |

(Total 1 mark)

Q4. Which graph shows how the resistance per unit length r of a wire varies with diameter D of the wire?



- | | |
|----------|--------------------------|
| A | <input type="checkbox"/> |
| B | <input type="checkbox"/> |
| C | <input type="checkbox"/> |
| D | <input type="checkbox"/> |

(Total 1 mark)

- Q5.** When a constant potential difference (pd) is applied across the ends of a uniform wire there is a current I in the wire.

The wire is replaced by one made from the same material, but of double the length and double the diameter. The same pd is applied across the ends.

What is the new current?

- | | | |
|----------|---------------|--------------------------|
| A | $4I$ | <input type="checkbox"/> |
| B | $2I$ | <input type="checkbox"/> |
| C | $\frac{I}{2}$ | <input type="checkbox"/> |
| D | $\frac{I}{4}$ | <input type="checkbox"/> |

(Total 1 mark)

- Q6.** A solid copper cylinder has a volume $1.3 \times 10^{-4} \text{ m}^3$ and length 15 cm. Copper has a resistivity of $1.7 \times 10^{-8} \Omega\text{m}$.

What is the resistance between the two ends of the copper cylinder??

- | | | |
|----------|-----------------------------|--------------------------|
| A | $2.9 \times 10^{-6} \Omega$ | <input type="checkbox"/> |
| B | $2.0 \times 10^{-5} \Omega$ | <input type="checkbox"/> |
| C | $2.0 \times 10^{-3} \Omega$ | <input type="checkbox"/> |
| D | $2.9 \times 10^{-2} \Omega$ | <input type="checkbox"/> |

(Total 1 mark)

- Q7.** A metal wire of length 1.3 m has a resistance of 0.70 Ω .

The wire has a diameter of 0.50 mm

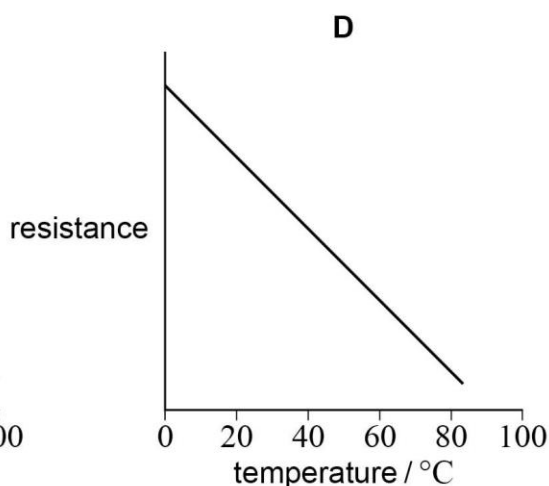
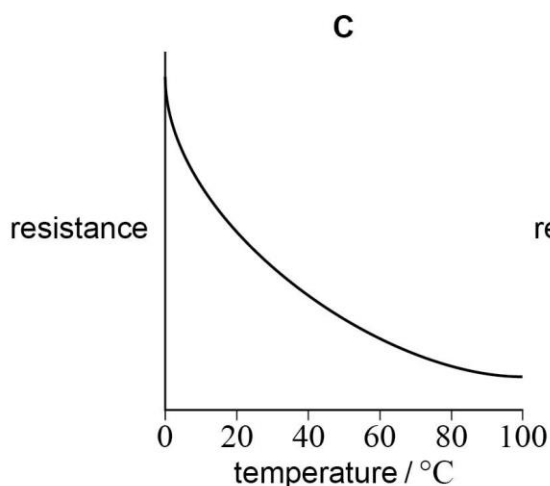
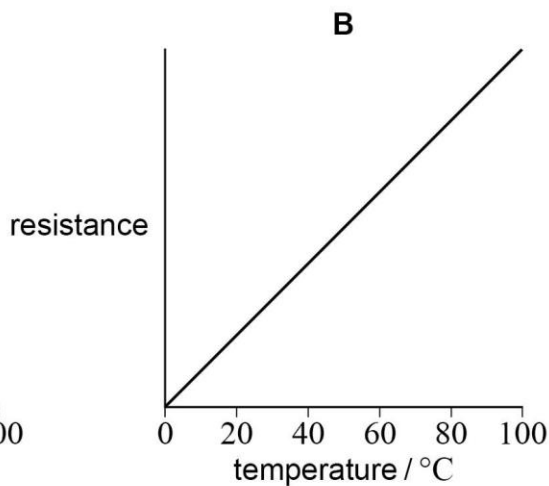
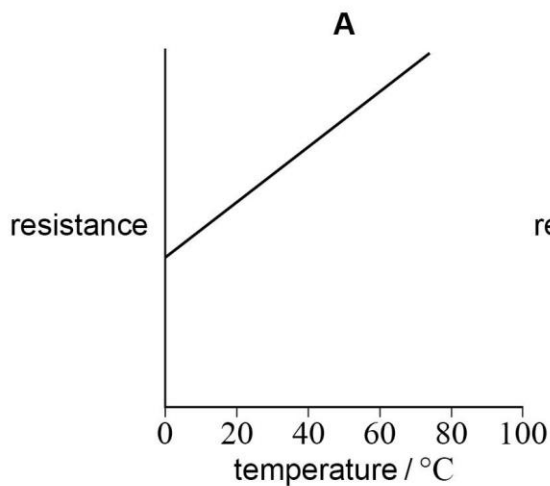
What is the resistance between the two ends of the copper cylinder??

- | | | |
|----------|---------------------------------------|--------------------------|
| A | $1.1 \times 10^{-5} \Omega \text{ m}$ | <input type="checkbox"/> |
| B | $1.1 \times 10^{-7} \Omega \text{ m}$ | <input type="checkbox"/> |
| C | $2.1 \times 10^{-7} \Omega \text{ m}$ | <input type="checkbox"/> |
| D | $4.2 \times 10^{-7} \Omega \text{ m}$ | <input type="checkbox"/> |

(Total 1 mark)

10 Minutes on: 42 Resistance and Temperature

Q1. Which graph shows the variation of the resistance with temperature for an ntc thermistor?



- A
- B
- C
- D

(Total 1 mark)

Q2. When the temperature of a copper wire increases, its ability to conduct electricity

A remains the same.

B increases.

C decreases.

D remains the same at first and then increases.

(Total 1 mark)

Q3 Which statement about superconductors is correct?

A When a material becomes a superconductor, its resistivity is almost zero.

B The temperature at which a material becomes a superconductor is called the critical temperature.

C When current passes through a superconductor the pd across it becomes a maximum.

D Copper is a superconductor at room temperature.

(Total 1 mark)

Q4. Superconductors are used to

A increase the strength of electricity cables.

B make light dependent resistors.

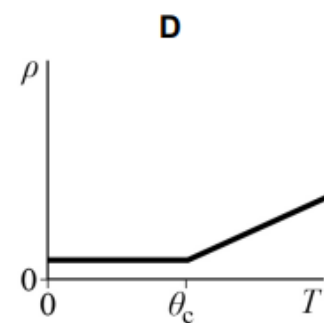
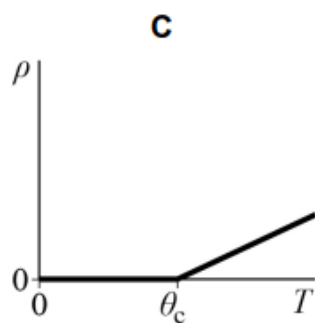
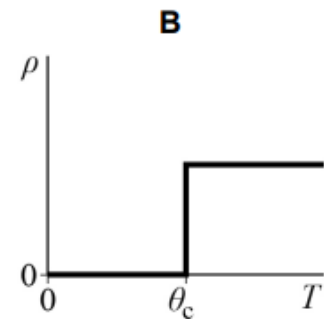
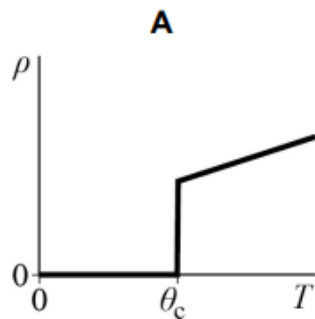
C produce strong magnetic fields.

D increase the rate of heat energy transfer.

(Total 1 mark)

Q5. A superconductor has a critical temperature.

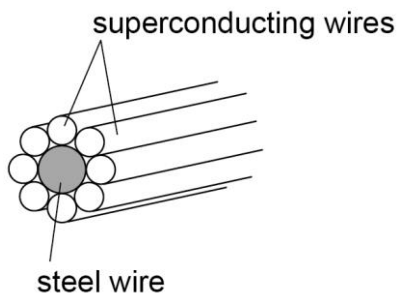
Which graph shows the variation of resistivity ρ with temperature T for this superconductor?



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

(Total 1 mark)

Q6 A cable consists of superconducting wires attached in parallel to a steel wire.

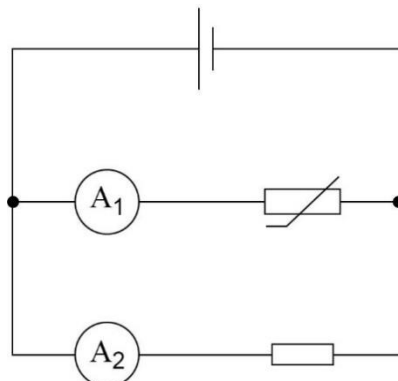


What is the purpose of the steel wire in the cable?

- A** to increase the critical temperature of the superconductor
- B** to increase the strength of the cable
- C** to reduce the resistance of the cable when it is superconducting
- D** to reduce the current in the cable

(Total 1 mark)

Q7. A circuit consists of a cell, a thermistor, a fixed resistor and two ammeters.



The cell has a constant electromotive force and negligible internal resistance. Readings from the two ammeters are taken.

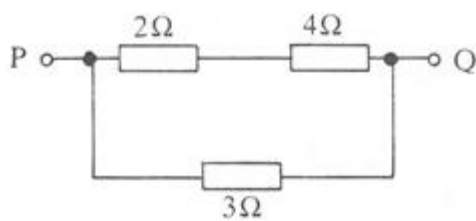
Which row describes what happens to the current in each ammeter when the temperature of the thermistor decreases?

	Current in ammeter A ₁	Current in ammeter A ₂	
A	Decreases	Unchanged	<input type="radio"/>
B	Decreases	Increases	<input type="radio"/>
C	Increases	Decreases	<input type="radio"/>
D	Increases	Unchanged	<input type="radio"/>

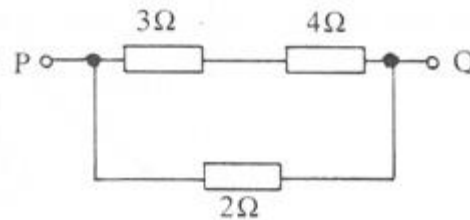
(Total 1 mark)

10 minutes on: 43 Resistors in Series and Parallel

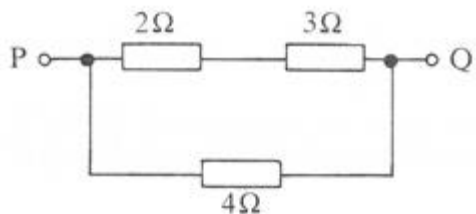
Q1. Which resistor arrangement has the greatest value of resistance?



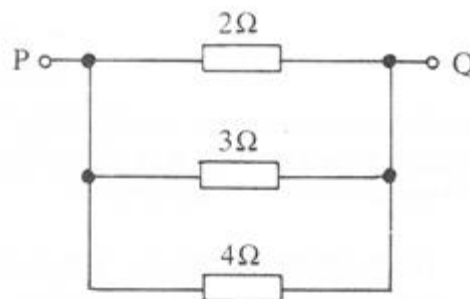
A



B



C



D

A

B

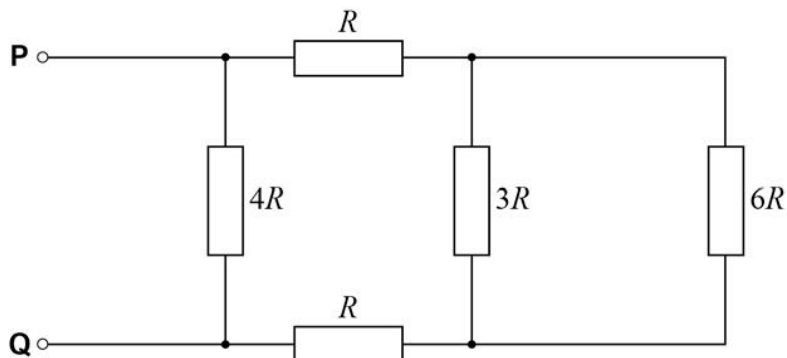
C

D

(Total 1 mark)

Q2. The diagram shows a network of resistors connected between the terminals **P** and **Q**.

The resistance of each resistor is shown.

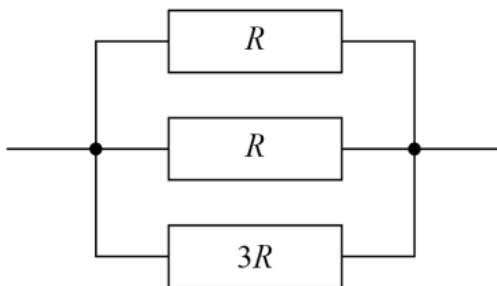


What is the effective resistance between **P** and **Q**?

- | | | |
|----------|------|-----------------------|
| A | R | <input type="radio"/> |
| B | $2R$ | <input type="radio"/> |
| C | $3R$ | <input type="radio"/> |
| D | $4R$ | <input type="radio"/> |

(Total 1 mark)

Q3. Resistors of resistance R , R and $3R$ are connected as shown.



What is the resistance of the arrangement?

- | | | |
|----------|----------------|-----------------------|
| A | $\frac{3R}{7}$ | <input type="radio"/> |
| B | $\frac{7R}{3}$ | <input type="radio"/> |
| C | $\frac{5R}{6}$ | <input type="radio"/> |
| D | $\frac{6R}{5}$ | <input type="radio"/> |

(Total 1 mark)

Q4. The table shows the resistivity, length and cross-sectional area of wires P and Q.

	resistivity	length	cross-sectional area
wire P	ρ	L	A
wire Q	$\frac{\rho}{4}$	L	$\frac{A}{2}$

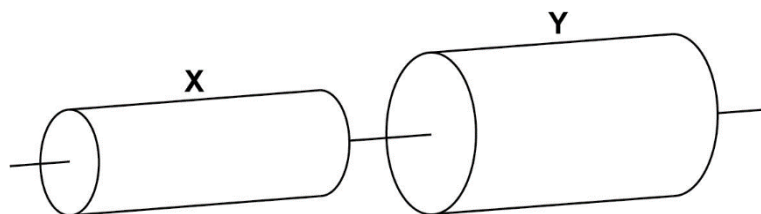
The resistance of wire P is R .

What is the total resistance of the wires when they are connected in parallel?

- A** $\frac{R}{9}$
- B** $\frac{R}{3}$
- C** $\frac{2R}{3}$
- D** $\frac{3R}{2}$

(Total 1 mark)

Q5. The two resistors shown are both uniform cylinders of equal length made from the same conducting putty.



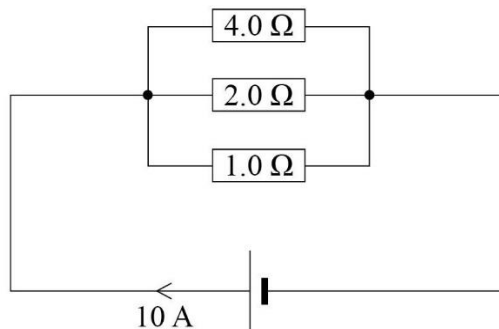
The diameter of **Y** is twice that of **X**. The resistance of **Y** is R .

What is the total resistance of the combination?

- A** $\frac{4R}{5}$
- B** $3R$
- C** $4R$
- D** $5R$

(Total 1 mark)

Q6. The current in the cell is 10 A as shown.



What is the current in the 2.0 Ω resistor?

- | | | |
|----------|--------|-----------------------|
| A | 0.35 A | <input type="radio"/> |
| B | 2.86 A | <input type="radio"/> |
| C | 3.50 A | <input type="radio"/> |
| D | 7.14 A | <input type="radio"/> |

(Total 1 mark)

Q7. The combined resistance of n identical resistors connected in parallel is R_n .

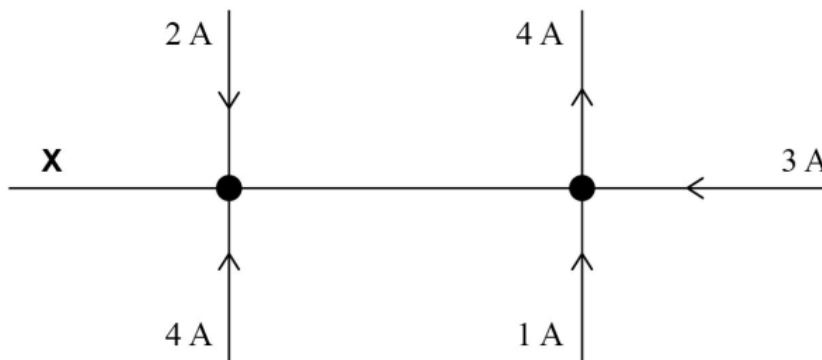
Which statement correctly describes the variation of R_n as n increases?

- | | | |
|----------|---|-----------------------|
| A | R_n decreases linearly as n increases | <input type="radio"/> |
| B | R_n decreases non-linearly as n increases | <input type="radio"/> |
| C | R_n increases linearly as n increases | <input type="radio"/> |
| D | R_n increases non-linearly as n increases | <input type="radio"/> |

(Total 1 mark)

10 minutes on: 44 Series and Parallel Circuits

Q1. The diagram shows the currents in a set of wires.

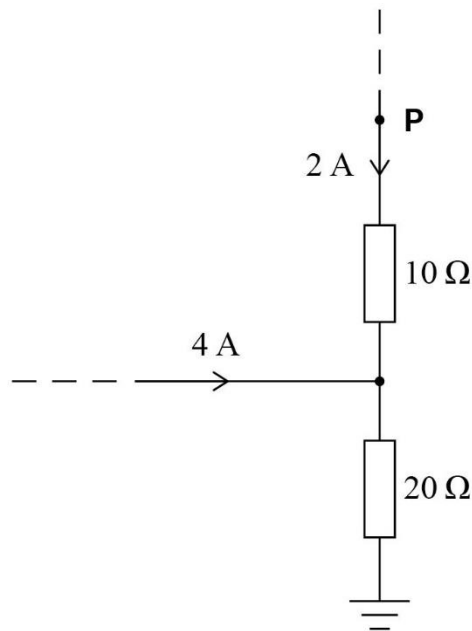


What is the magnitude of the current at **X**?

- | | | |
|----------|------|-----------------------|
| A | zero | <input type="radio"/> |
| B | 2 A | <input type="radio"/> |
| C | 3 A | <input type="radio"/> |
| D | 6 A | <input type="radio"/> |

(Total 1 mark)

Q2. The diagram shows part of a circuit and the currents in the circuit.

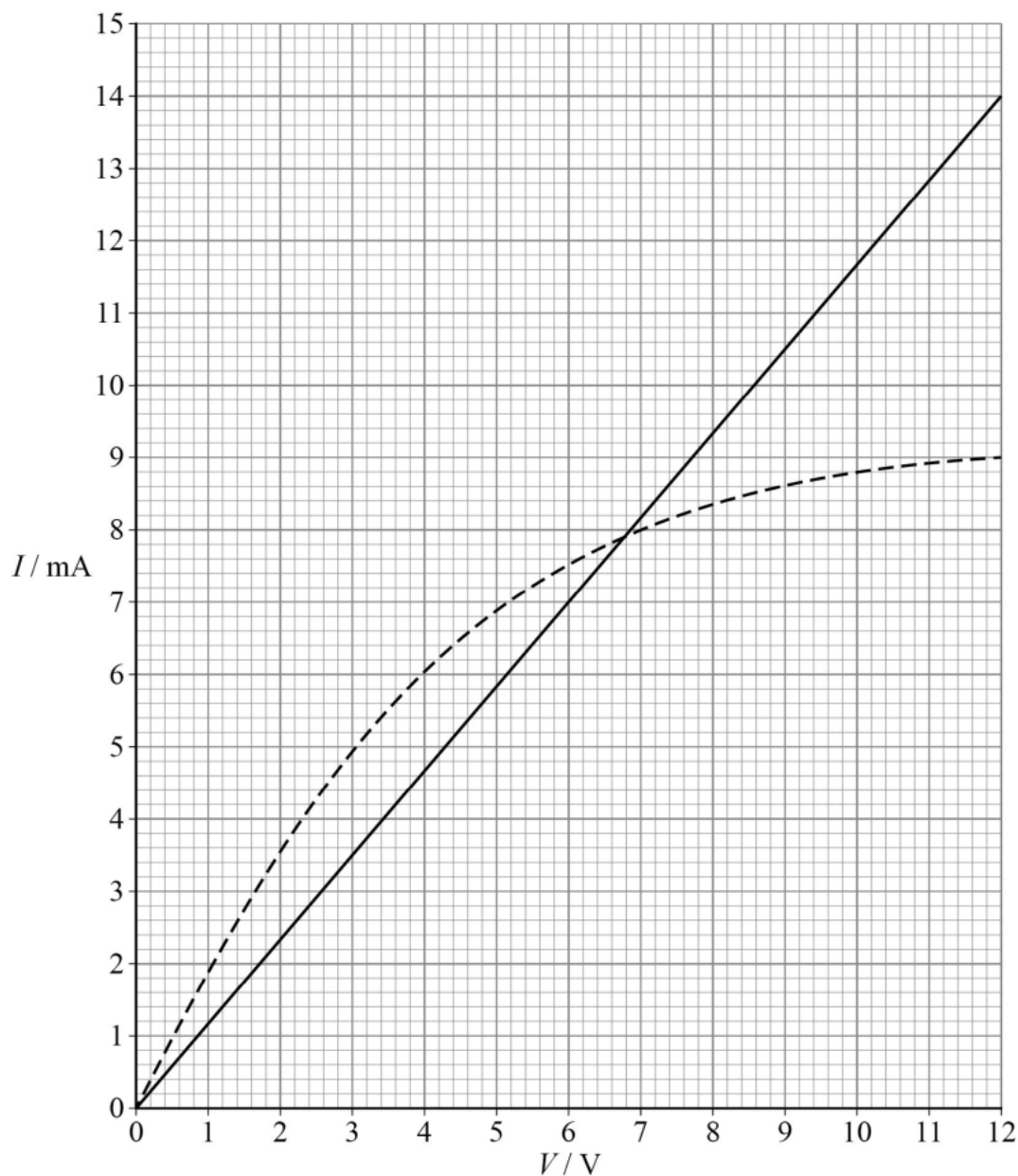


What is the potential difference between point P and earth?

- | | | |
|----------|-------|--------------------------|
| A | 60 V | <input type="checkbox"/> |
| B | 100 V | <input type="checkbox"/> |
| C | 120 V | <input type="checkbox"/> |
| D | 140 V | <input type="checkbox"/> |

(Total 1 mark)

Q3. The graph shows the current–voltage (I – V) characteristics for two components.



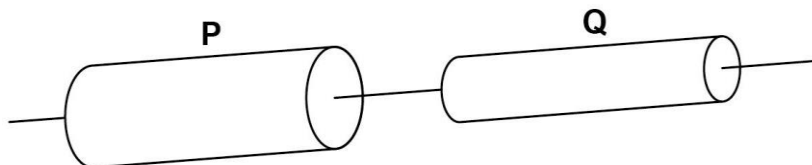
The two components are connected in parallel with a 12 V battery that has negligible internal resistance.

What is the current in the battery?

- A** 7.9 mA
- B** 14.5 mA
- C** 15.8 mA
- D** 23.0 mA

- Q4.** Two cylindrical wires **P** and **Q** are of equal length and made of the same material.
The diameter of **P** is greater than that of **Q**.

P and **Q** are connected in series and the ends of this arrangement are connected to a power supply.

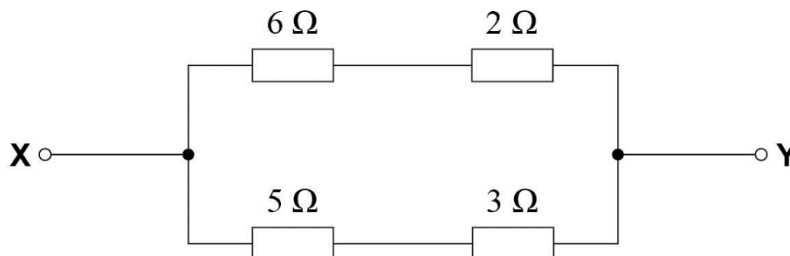


Which two quantities are the same for **P** and **Q**?

A	potential difference across wire	resistivity	<input type="checkbox"/>
B	resistivity	current	<input type="checkbox"/>
C	current	resistance	<input type="checkbox"/>
D	resistance	potential difference across wire	<input type="checkbox"/>

(Total 1 mark)

- Q5.** In the circuit shown, a potential difference of 3.0 V is applied across **XY**.

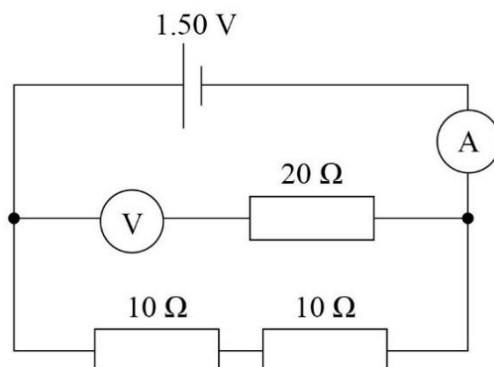


What is the current in the 5 Ω resistor?

- A** 0.38 A
- B** 0.60 A
- C** 0.75 A
- D** 2.7 A

(Total 1 mark)

- Q6.** The circuit shows a cell with negligible internal resistance connected in a circuit with three resistors, an ammeter and a voltmeter.

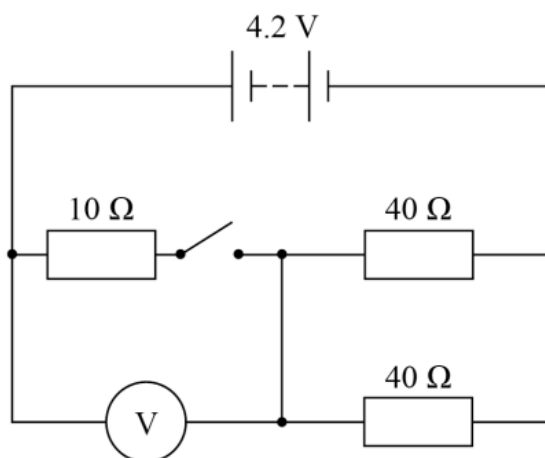


Which row shows the readings on the ammeter and voltmeter?

	Current / A	Voltage / V	
A	0.075	0.75	<input type="radio"/>
B	0.075	1.50	<input type="radio"/>
C	0.150	0.75	<input type="radio"/>
D	0.150	1.50	<input type="radio"/>

(Total 1 mark)

Q7. The battery in this circuit has an emf of 4.2 V and negligible internal resistance.



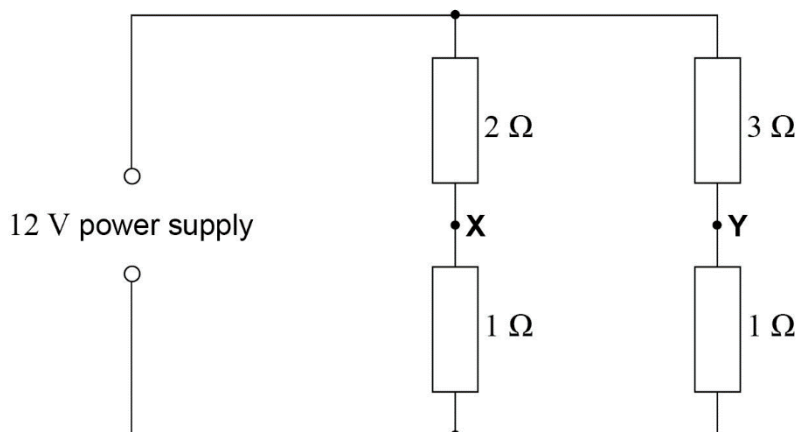
What are the readings on the voltmeter when the switch is open (off) and when the switch is closed (on)?

	Open	Closed	
A	0 V	2.1 V	<input type="checkbox"/>
B	4.2 V	2.1 V	<input type="checkbox"/>
C	0 V	1.4 V	<input type="checkbox"/>
D	4.2 V	1.4 V	<input type="checkbox"/>

(Total 1 mark)

10 minutes on: 45 Potential Dividers Basics

- Q1.** In this resistor network, the emf of the supply is 12 V and it has negligible internal resistance.

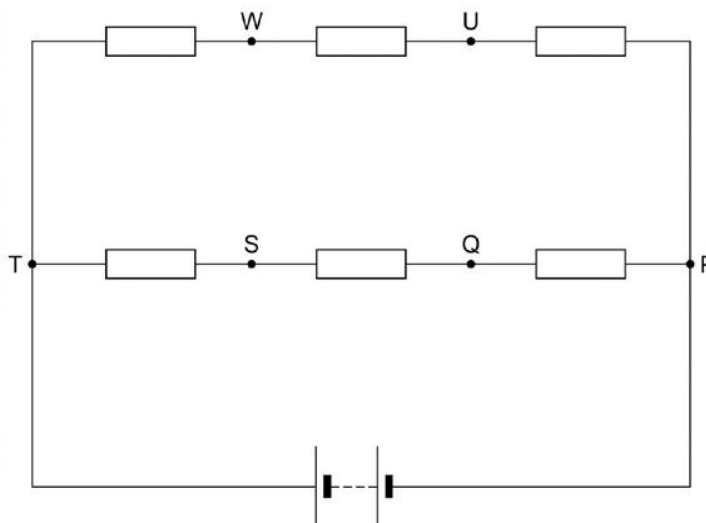


What is the reading on a voltmeter connected between points **X** and **Y**?

- | | | |
|----------|-----|--------------------------|
| A | 0 V | <input type="checkbox"/> |
| B | 1 V | <input type="checkbox"/> |
| C | 3 V | <input type="checkbox"/> |
| D | 4 V | <input type="checkbox"/> |

(Total 1 mark)

Q2. In the circuit shown below, each of the resistors has the same resistance.



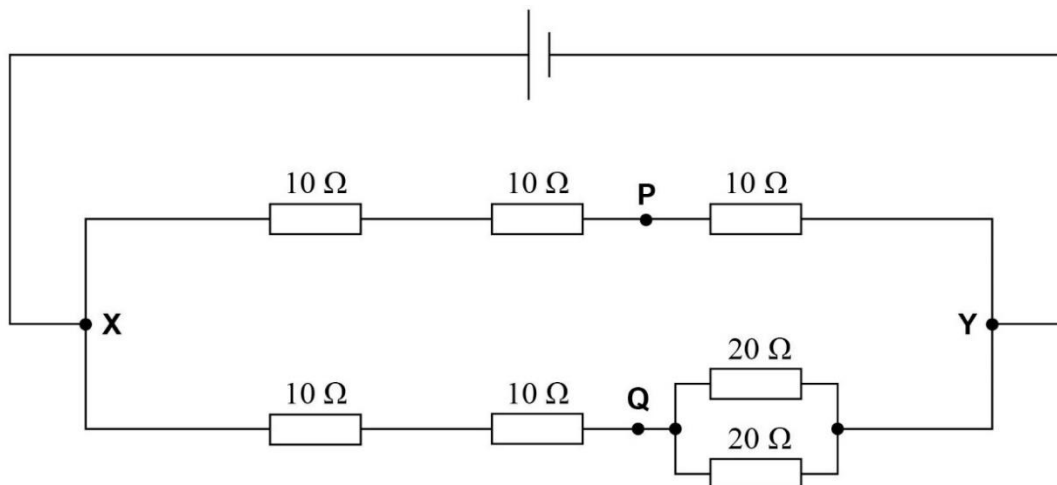
A voltmeter with very high resistance is connected between two points in the circuit.

Between which two points of connection would the voltmeter read zero?

- A** Q and U
- B** P and T
- C** Q and W
- D** S and U

(Total 1 mark)

Q3. The potential difference between points **X** and **Y** is V .



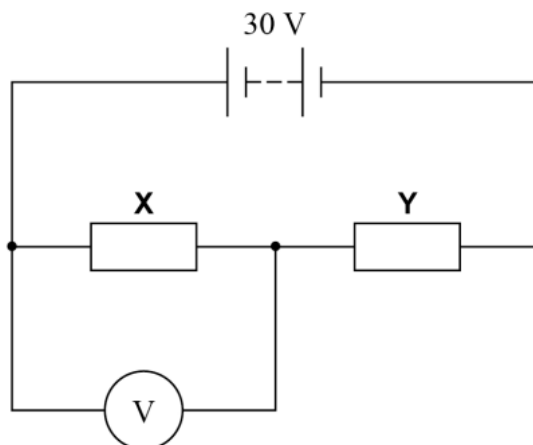
What is the potential difference between **P** and **Q**?

- | | | |
|----------|----------------|-----------------------|
| A | zero | <input type="radio"/> |
| B | $\frac{V}{3}$ | <input type="radio"/> |
| C | $\frac{V}{2}$ | <input type="radio"/> |
| D | $\frac{2V}{3}$ | <input type="radio"/> |

(Total 1 mark)

Q4. Two resistors **X** and **Y** are connected in series with a power supply of emf 30 V and negligible internal resistance.

The resistors are made from wire of the same material. The wires have the same length. **X** uses wire of diameter d and **Y** uses wire of diameter $2d$.

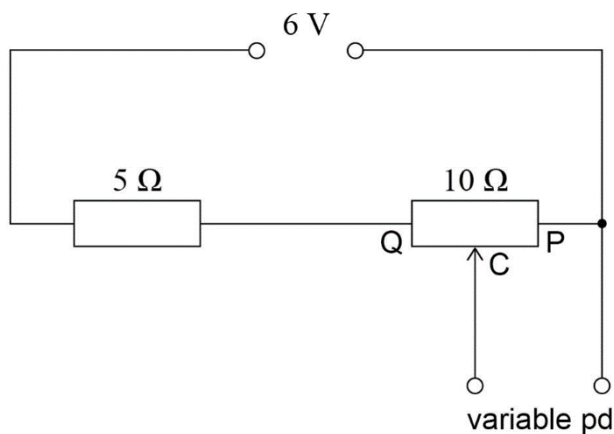


What is the reading on the voltmeter?

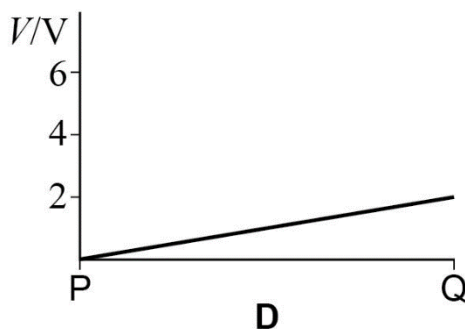
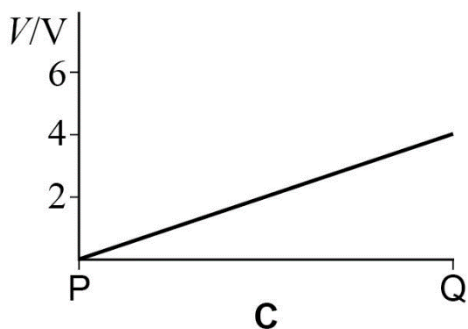
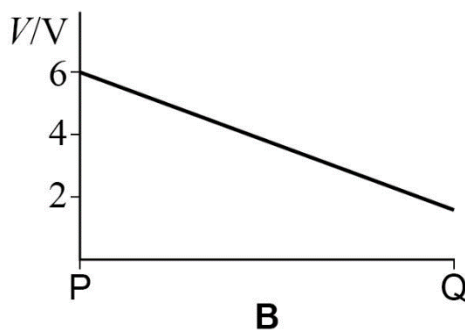
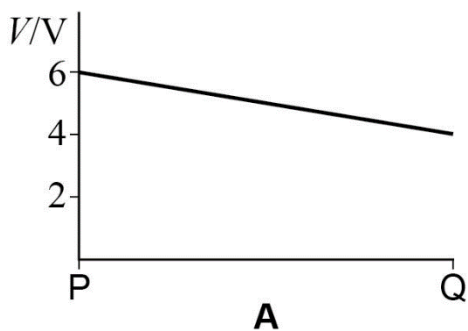
- | | | |
|----------|------|-----------------------|
| A | 10 V | <input type="radio"/> |
| B | 15 V | <input type="radio"/> |
| C | 20 V | <input type="radio"/> |
| D | 24 V | <input type="radio"/> |

(Total 1 mark)

Q5. The circuit shown is used to supply a variable potential difference (pd) to another circuit.



Which graph shows how the pd supplied V varies as the moving contact C is moved from position P to position Q ?



A

B

C

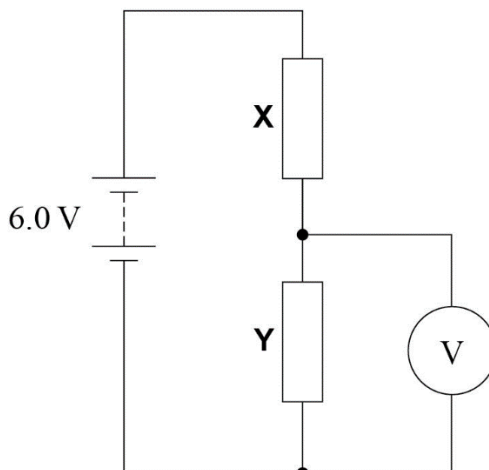
D

(Total 1 mark)

Q6. Resistors **X** and **Y** are connected in series with a 6.0 V battery of negligible internal resistance.

X has resistance R and **Y** has resistance $\frac{R}{2}$.

A voltmeter of resistance R is connected across **Y**.

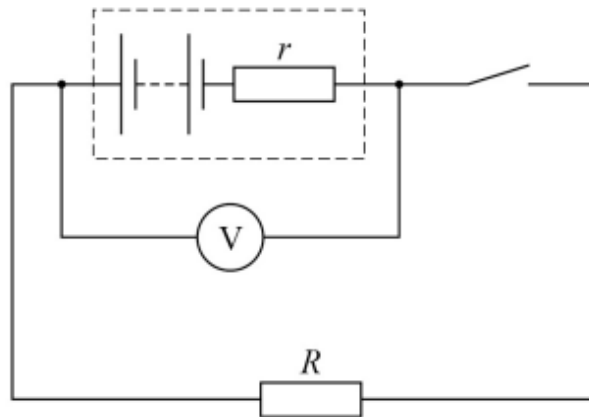


What is the reading on the voltmeter?

- | | | |
|----------|-------|-----------------------|
| A | 0.0 V | <input type="radio"/> |
| B | 1.5 V | <input type="radio"/> |
| C | 3.0 V | <input type="radio"/> |
| D | 4.5 V | <input type="radio"/> |

(Total 1 mark)

- Q7.** The diagram shows a 12 V battery connected to a resistor of resistance R . The voltmeter reads 10 V when the switch is closed.



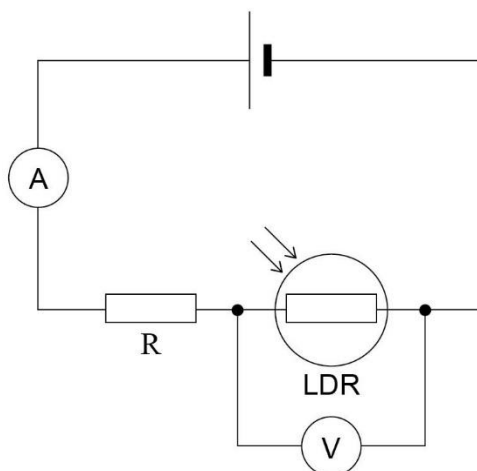
What is the internal resistance r of the battery?

- | | | |
|----------|---------------|--------------------------|
| A | $\frac{R}{6}$ | <input type="checkbox"/> |
| B | $\frac{R}{5}$ | <input type="checkbox"/> |
| C | $5R$ | <input type="checkbox"/> |
| D | $6R$ | <input type="checkbox"/> |

(Total 1 mark)

10 minutes on: 46 Sensing Circuits

- Q1.** The figure shows a light dependent resistor (LDR) and fixed resistor R connected in series across a cell. The internal resistance of the cell is negligible.

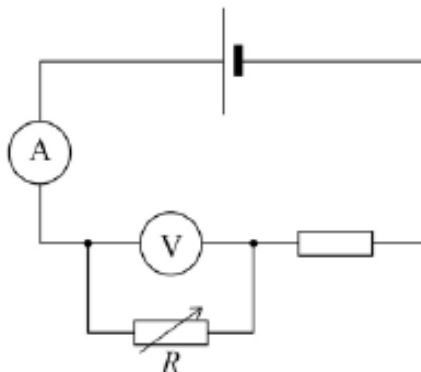


Which row shows how the readings on the ammeter and the voltmeter change when the light intensity incident on the LDR is increased?

	Ammeter reading	Voltmeter reading	
A	decreases	increases	<input type="radio"/>
B	decreases	decreases	<input type="radio"/>
C	increases	increases	<input type="radio"/>
D	increases	decreases	<input type="radio"/>

(Total 1 mark)

Q2. In the circuit shown in the diagram the cell has negligible internal resistance.

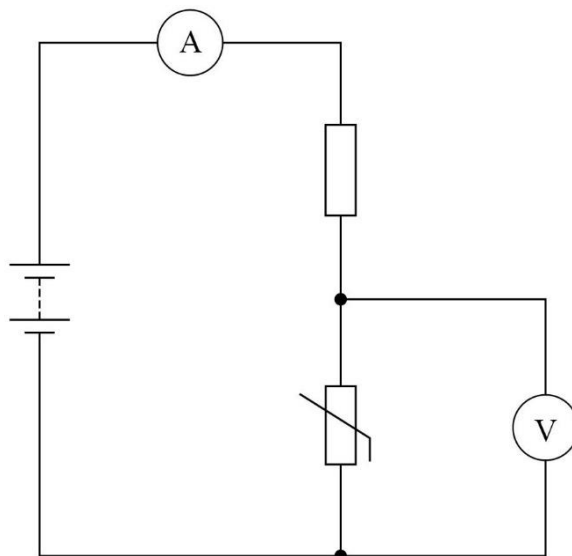


What happens to the reading of both meters when the resistance of R is decreased?

	Reading of ammeter	Reading of voltmeter	
A	increases	increases	<input type="radio"/>
B	increases	decreases	<input type="radio"/>
C	decreases	increases	<input type="radio"/>
D	unchanged	decreases	<input type="radio"/>

(Total 1 mark)

Q3. The diagram shows a temperature-sensing circuit.



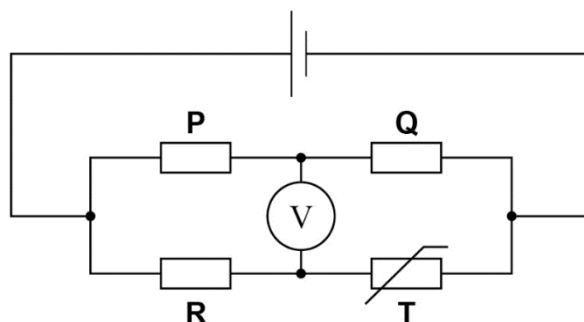
The temperature of the thermistor is decreased.

Which row shows the changes to the ammeter reading and the voltmeter reading?

	Ammeter reading	Voltmeter reading	
A	increases	increases	<input type="radio"/>
B	increases	decreases	<input type="radio"/>
C	decreases	decreases	<input type="radio"/>
D	decreases	increases	<input type="radio"/>

(Total 1 mark)

Q4. In the circuit below, the voltmeter reading is zero.



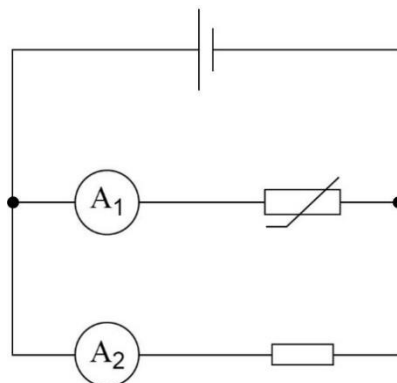
When the temperature of the thermistor **T** is increased, the voltmeter reading changes.

Which change to the circuit will restore the voltmeter to zero?

- A** a reduction in the emf of the cell
- B** a reduction in the resistance of **P**
- C** an increase in the resistance of **Q**
- D** a reduction in the resistance of **R**

(Total 1 mark)

Q5. A circuit consists of a cell, a thermistor, a fixed resistor and two ammeters.



The cell has a constant electromotive force and negligible internal resistance. Readings from the two ammeters are taken.

Which row describes what happens to the current in each ammeter when the temperature of the thermistor decreases?

	Current in ammeter A ₁	Current in ammeter A ₂	
A	Decreases	Unchanged	<input type="radio"/>
B	Decreases	Increases	<input type="radio"/>
C	Increases	Decreases	<input type="radio"/>
D	Increases	Unchanged	<input type="radio"/>

(Total 1 mark)

Q6. A voltmeter has a resistance of 4.0 kΩ and reads 1.0 V for every scale division on the meter.

A power supply of emf 20 V and negligible internal resistance is connected across this voltmeter and a thermistor in series. The voltmeter reads two divisions.

What is the value of the thermistor?

- A** 44 kΩ
- B** 36 kΩ
- C** 4.4 kΩ
- D** 3.6 kΩ

(Total 1 mark)

Q7. A potential divider circuit consists of a battery connected across a thermistor and variable resistor in series.

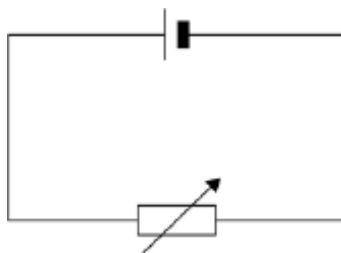
Which of the following causes the potential difference (pd) across the thermistor to increase?

- A increasing the temperature of the thermistor
- B increasing the resistance of the variable resistor
- C reducing the emf of the battery
- D adding a resistor across the variable resistor

(Total 1 mark)

10 minutes on: 47 EMF and Internal Resistance

Q1. The cell in the circuit has an emf of 2.0 V. When the variable resistor has a resistance of 4.0 Ω , the potential difference (pd) across the terminals of the cell is 1.0 V.

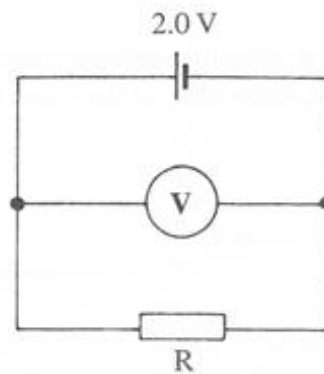


What is the pd across the terminals of the cell when the resistance of the variable resistor is 12 Ω ?

- A 0.25 V
- B 0.75 V
- C 1.33 V
- D 1.50 V

(Total 1 mark)

Q2. The cell in the following circuit has an emf of 2.0 V and an internal resistance of 1.0 Ω .

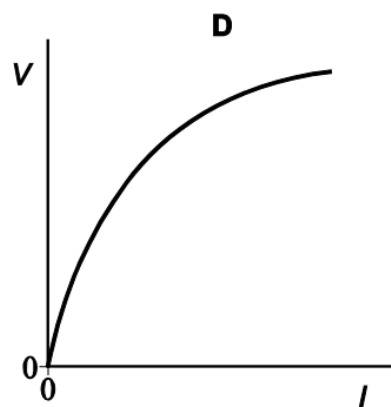
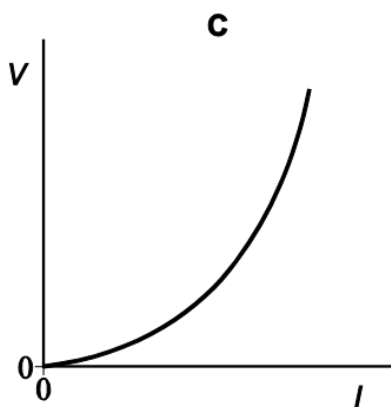
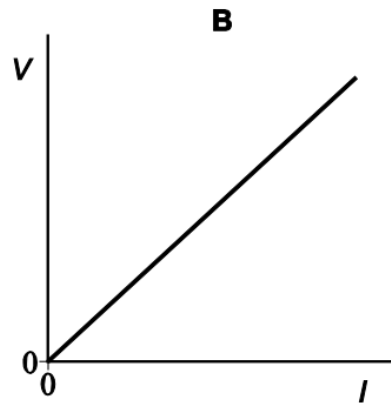
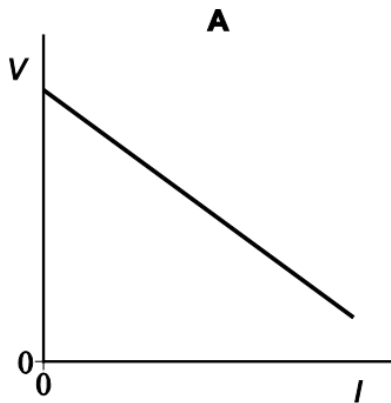


The digital voltmeter reads 1.6 V. What is the resistance of R?

- | | | |
|----------|--------------|-----------------------|
| A | 0.4 Ω | <input type="radio"/> |
| B | 1.0 Ω | <input type="radio"/> |
| C | 2.0 Ω | <input type="radio"/> |
| D | 4.0 Ω | <input type="radio"/> |

(Total 1 mark)

Q3. A student investigates how the potential difference V across the terminals of a cell varies with the current I in the cell.



Which graph correctly shows how V varies with I ?

A

B

C

D

(Total 1 mark)

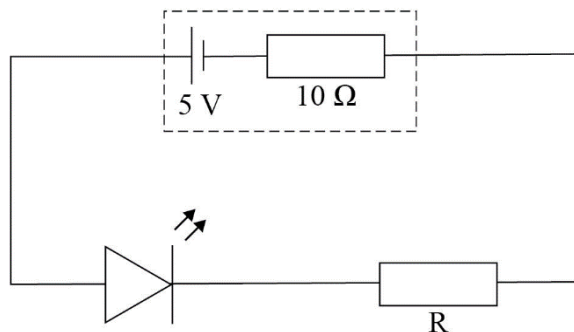
Q4. A battery is connected to a $10\ \Omega$ resistor and a switch in series. A voltmeter is connected across the battery. When the switch is open (off) the voltmeter reads $1.45\ \text{V}$. When the switch is closed the reading is $1.26\ \text{V}$.

What is the internal resistance of the battery?

- | | | |
|----------|----------------|-----------------------|
| A | $0.66\ \Omega$ | <input type="radio"/> |
| B | $0.76\ \Omega$ | <input type="radio"/> |
| C | $1.3\ \Omega$ | <input type="radio"/> |
| D | $1.5\ \Omega$ | <input type="radio"/> |

(Total 1 mark)

Q5. In the circuit below, the potential difference across the light emitting diode (LED) is $1.8\ \text{V}$ when it is emitting light. The current in the circuit is $20\ \text{mA}$.

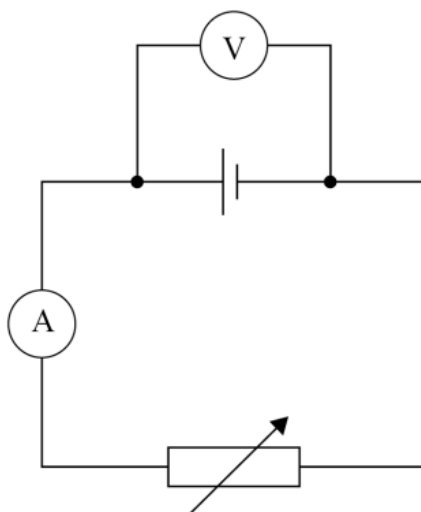


What is the value of the resistor R?

- | | | |
|----------|---------------|-----------------------|
| A | $80\ \Omega$ | <input type="radio"/> |
| B | $90\ \Omega$ | <input type="radio"/> |
| C | $150\ \Omega$ | <input type="radio"/> |
| D | $160\ \Omega$ | <input type="radio"/> |

(Total 1 mark)

Q6. In the circuit shown, the cell has an emf of 12 V and an internal resistance which is not negligible.



When the resistance of the variable resistor is $10\ \Omega$ the voltmeter reads 10 V and the ammeter reads 1.0 A.

The resistance of the variable resistor is changed to $5\ \Omega$.

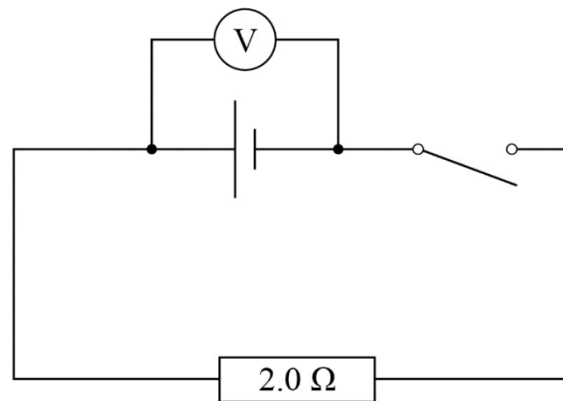
What is the new reading on the ammeter?

- | | | |
|----------|-------|--------------------------|
| A | 1.4 A | <input type="checkbox"/> |
| B | 1.7 A | <input type="checkbox"/> |
| C | 2.0 A | <input type="checkbox"/> |
| D | 2.4 A | <input type="checkbox"/> |

(Total 1 mark)

Q7. In the circuit, the reading of the voltmeter is V .

When the switch is closed the reading becomes $\frac{V}{3}$.



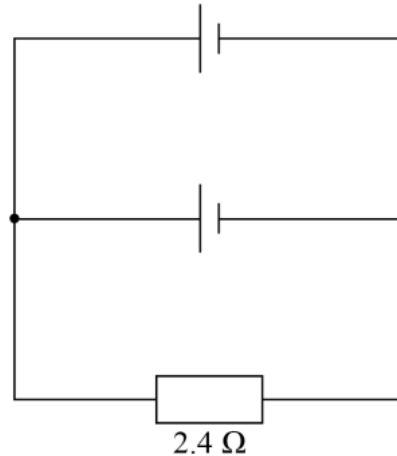
What is the internal resistance of the cell?

- | | | |
|----------|--------|-----------------------|
| A | 0.33 Ω | <input type="radio"/> |
| B | 0.67 Ω | <input type="radio"/> |
| C | 4.0 Ω | <input type="radio"/> |
| D | 6.0 Ω | <input type="radio"/> |

(Total 1 mark)

10 minutes on: 48 Cells in Series and Parallel

- Q1.** Two identical batteries each of emf 1.5 V and internal resistance 1.6 Ω are connected in parallel. A 2.4 Ω resistor is connected in parallel with this combination.

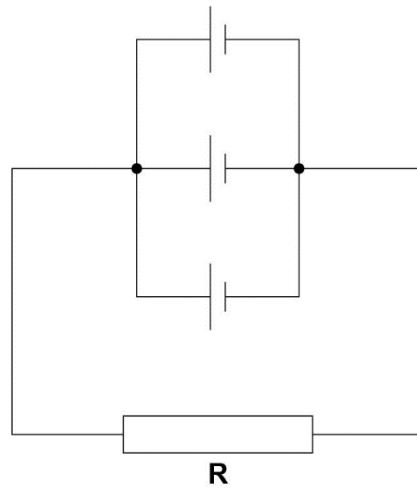


What is the current in the 2.4 Ω resistor?

- | | | |
|----------|--------|-----------------------|
| A | 0.38 A | <input type="radio"/> |
| B | 0.47 A | <input type="radio"/> |
| C | 0.75 A | <input type="radio"/> |
| D | 0.94 A | <input type="radio"/> |

(Total 1 mark)

- Q2.** Three identical cells, each of emf 1.5 V and internal resistance 6.0 Ω , are connected to resistor **R**. The resistance of **R** is 6.0 Ω .



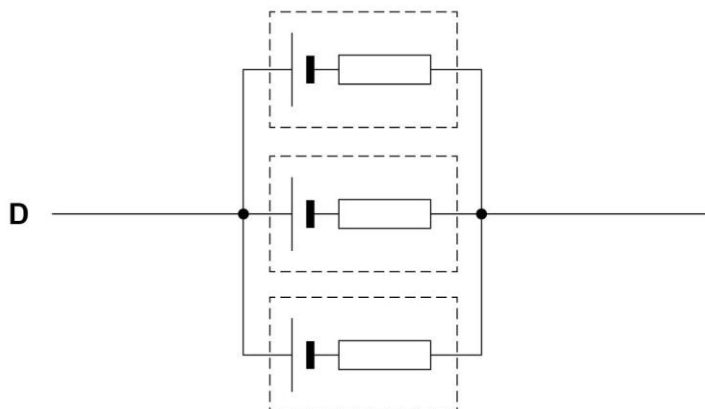
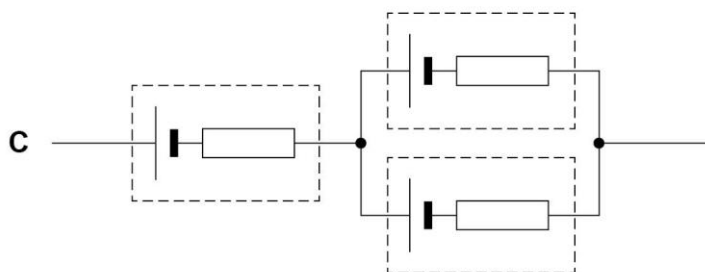
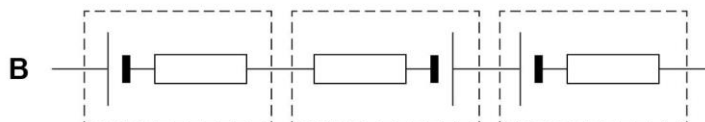
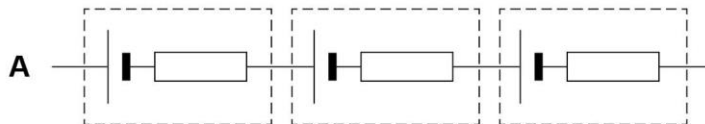
What is the current in **R**?

- | | | |
|----------|--------|-----------------------|
| A | 0.19 A | <input type="radio"/> |
| B | 0.25 A | <input type="radio"/> |
| C | 0.56 A | <input type="radio"/> |
| D | 0.75 A | <input type="radio"/> |

(Total 1 mark)

Q3. Three cells each have an emf $\varepsilon = 1.5 \text{ V}$ and an internal resistance $r = 0.6 \Omega$.

Which combination of these cells will deliver a total emf of 1.5 V and a maximum current of 7.5 A ?



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

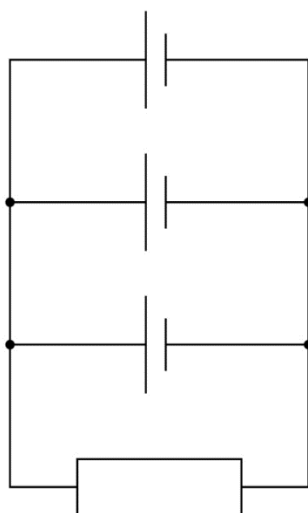
(Total 1 mark)

Q4. Three identical cells, each of internal resistance R , are connected in series with an external resistor of resistance R . The current in the external resistor is I . If one of the cells is reversed in the circuit, what is the new current in the external resistor?

- A** $\frac{I}{3}$
- B** $\frac{4I}{9}$
- C** $\frac{I}{2}$
- D** $\frac{2I}{3}$

(Total 1 mark)

Q5. A resistor of resistance R and three identical cells of emf E and internal resistance r are connected as shown.



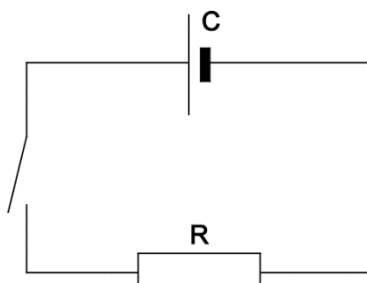
What is the current in the resistor?

- A** $\frac{3E}{(3R + r)}$
- B** $\frac{9E}{(3R + r)}$
- C** $\frac{E}{R}$
- D** $\frac{3E}{R}$

(Total 1 mark)

Q6. A cell C of negligible resistance and a switch are in series with a resistor R. The switch is moved to the on (closed) position for a time t .

Which change reduces the amount of charge flowing through R in time t ?

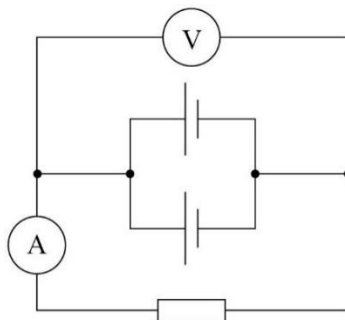


- A add an identical cell in parallel with C
- B add an identical cell in series with C
- C add a second resistor in series with R
- D add a second resistor in parallel with R

(Total 1 mark)

Q7. A circuit consists of two identical cells, a resistor, an ammeter and a voltmeter. The cells each have an emf of 3.0 V and the resistor has a resistance of 12 Ω

The cells have negligible internal resistance.



Which row shows the readings on the voltmeter and ammeter?

	Voltage / V	Current / A	
A	3.0	0.25	<input type="checkbox"/>
B	3.0	0.50	<input type="checkbox"/>
C	6.0	0.25	<input type="checkbox"/>
D	6.0	0.50	<input type="checkbox"/>

(Total 1 mark)

10 minutes on: 49 Electrical Energy

Q1. What quantity is measured in kW h?

- | | | |
|----------|---------|-----------------------|
| A | charge | <input type="radio"/> |
| B | current | <input type="radio"/> |
| C | energy | <input type="radio"/> |
| D | power | <input type="radio"/> |

(Total 1 mark)

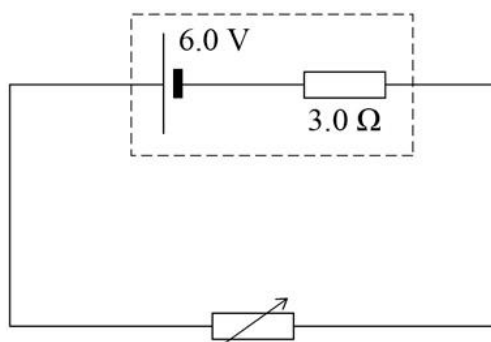
Q2. A battery of negligible internal resistance and an emf of 12 V is connected in series with a heating element. The heating element has a resistance of 6.5Ω when in operation.

What is the energy transferred by the heating element when operating for 5 minutes?

- | | | |
|----------|----------|-----------------------|
| A | 111 J | <input type="radio"/> |
| B | 390 J | <input type="radio"/> |
| C | 6650 J | <input type="radio"/> |
| D | 23 400 J | <input type="radio"/> |

(Total 1 mark)

Q3. The cell in the following circuit has an emf (electromotive force) of 6.0 V and an internal resistance of 3.0Ω . The resistance of the variable resistor is set to 12Ω .



How much electrical energy is converted into thermal energy **within the cell** in 1 minute?

- A 0.48 J
- B 29 J
- C 45 J
- D 144 J

(Total 1 mark)

Q4. An electric motor lifts a load of weight W through a vertical height h in time t .

The potential difference across the motor is V and the current through it is I .

What is the efficiency of the motor?

- A $\frac{Wh}{VI}$
- B $\frac{VI}{Wh}$
- C $\frac{Wh}{VI}$
- D $\frac{VI}{Wh}$

(Total 1 mark)

Q5. The capacity of a portable charger is rated in ampere hours (A h). A charger of capacity 1 A h can provide 1 A for 1 hour at its working voltage.

One charger has a capacity of 1800 mA h at a working voltage of 3.7 V.

What is the energy stored in this charger?

- A 6.5 kJ
- B 24 kJ
- C 400 kJ
- D 24 kJ

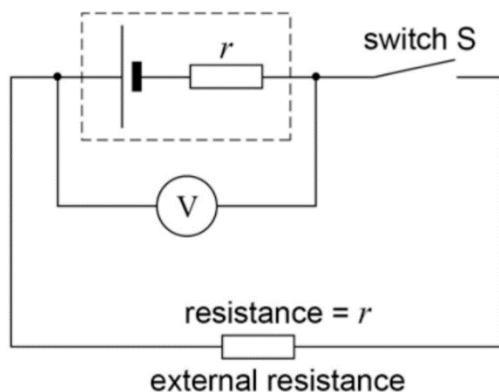
(Total 1 mark)

Q6. Which is equivalent to the ohm?

- A** $J C^{-2} s^{-1}$
- B** $J C^{-2} s$
- C** $J s$
- D** $J s^{-1}$

(Total 1 mark)

Q7. In the circuit shown, V is a voltmeter with a very high resistance. The internal resistance of the cell, r , is equal to the external resistance in the circuit.



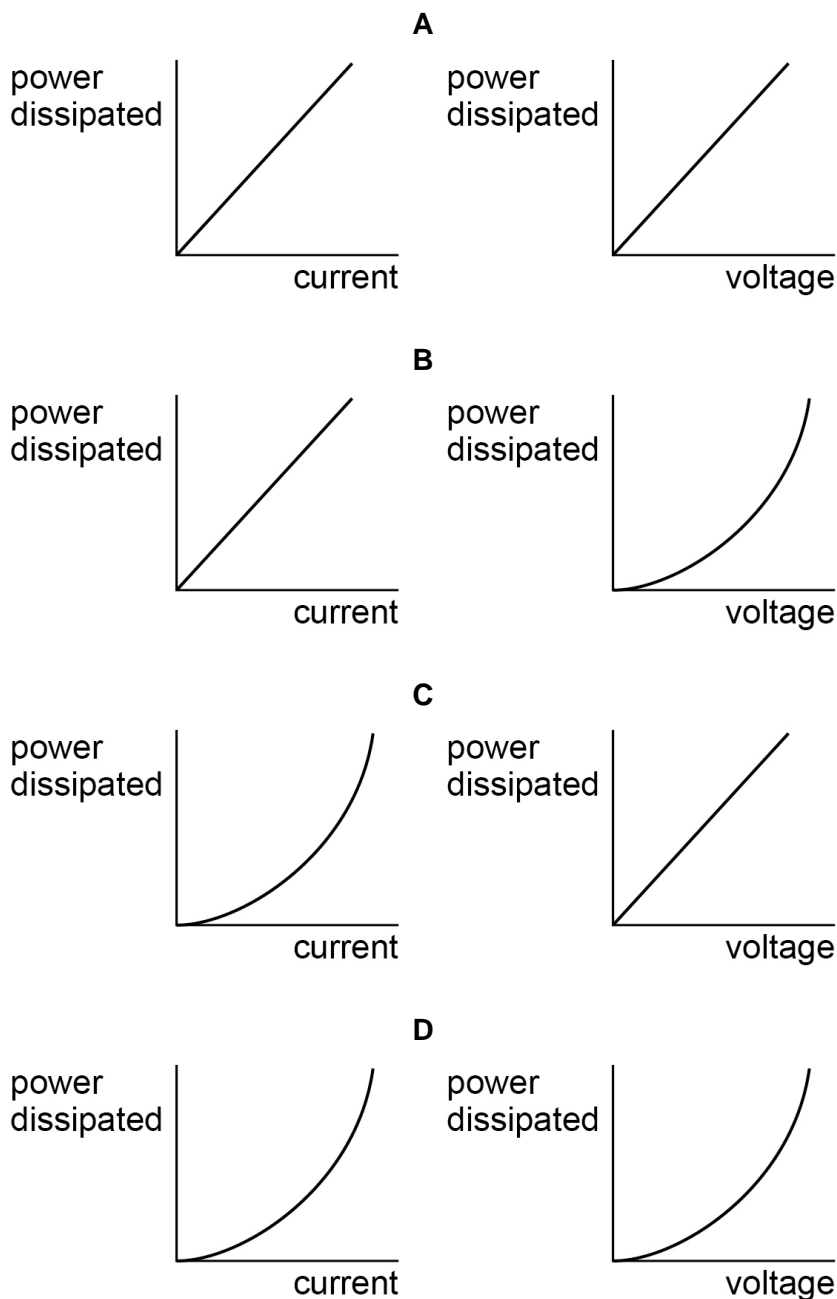
Which of the following is not equal to the emf of the cell?

- A** the reading of the voltmeter when the switch S is open
- B** the chemical energy changed to electrical energy when unit charge passes through the cell
- C** twice the reading of the voltmeter when the switch S is closed
- D** the electrical energy produced when unit current passes through the cell

(Total 1 mark)

10 minutes on: 50 Electrical Power

Q1. Which pair of graphs shows the variation of power dissipated with current, and the variation of power dissipated with voltage, for a resistor of constant resistance?



- A
- B
- C
- D

Q2. Which is a unit of power?

- A $C^2 \Omega s^{-1}$
- B $J C^{-1} s^{-1}$
- C $V C s^{-1}$
- D $V^2 \Omega$

(Total 1 mark)

Q3. A pd V is applied across a resistor. Another identical resistor is then connected in series with it and the same pd V is applied across the combination.

Which statement is **incorrect**?

- A The total resistance is doubled.
- B The pd across one resistor is $\frac{V}{2}$
- C The current in the resistors is halved.
- D The power dissipated in one resistor is halved.

(Total 1 mark)

Q4. A mobile phone operates at a constant power of 200 mW

It has a 3.7 V lithium-ion battery that has a charge capacity of 9400 C

What is the time taken for the battery to discharge completely?

- A 2 hours
- B 48 hours
- C 120 hours
- D 140 hours

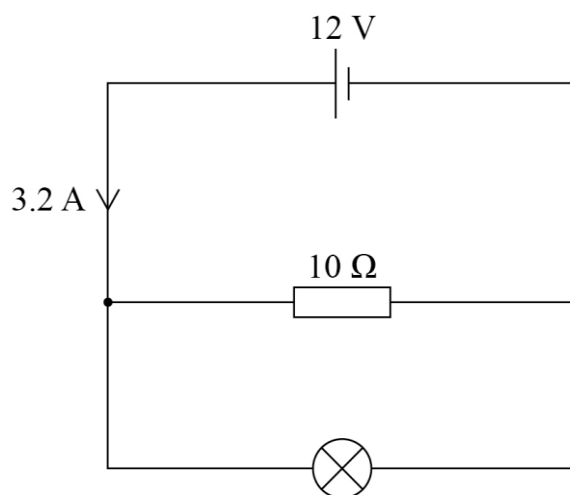
(Total 1 mark)

Q5. A filament lamp with resistance 12Ω is operated at a power of 36 W .
How much charge flows through the filament lamp during 15 minutes?

- | | | |
|----------|--------|-----------------------|
| A | 26 C | <input type="radio"/> |
| B | 1.6 kC | <input type="radio"/> |
| C | 2.7 kC | <input type="radio"/> |
| D | 6.5 kC | <input type="radio"/> |

(Total 1 mark)

Q6. A cell of negligible internal resistance is connected to a resistor and a lamp in parallel as shown.



What is the power dissipated by the lamp?

- | | | |
|----------|------|-----------------------|
| A | 14 W | <input type="radio"/> |
| B | 16 W | <input type="radio"/> |
| C | 24 W | <input type="radio"/> |
| D | 38 W | <input type="radio"/> |

(Total 1 mark)

Q7. A power of 100 kW at a potential difference of 10 kV is transmitted to a load resistor through cables of total resistance 5.0 Ω .

What is the power loss in the cables?

- A** 50 W
- B** 0.5 kW
- C** 100 kW
- D** 20 MW

(Total 1 mark)

10 minutes on: 51 Circular Motion

Q1. A mass on the end of a string is whirled round in a horizontal circle at increasing speed until the string breaks. The subsequent path taken by the mass is

- A** a straight line along a radius of the circle.
- B** a horizontal circle.
- C** a parabola in a horizontal plane.
- D** a parabola in a vertical plane.

(Total 1 mark)

Q2. For a particle moving in a circle with uniform speed, which one of the following statements is **incorrect**?

- A** There is no displacement of the particle in the direction of the force
- B** The force on the particle is always perpendicular to the velocity of the particle
- C** The velocity of the particle is constant
- D** The kinetic energy of the particle is constant

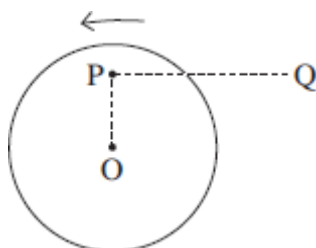
(Total 1 mark)

Q3. What is the angular speed of a point on the Earth's equator?

- A $7.3 \times 10^{-5} \text{ rad s}^{-1}$
- B $4.2 \times 10^{-3} \text{ rad s}^{-1}$
- C $2.6 \times 10^{-1} \text{ rad s}^{-1}$
- D 15 rad s^{-1}

(Total 1 mark)

Q4. A small mass is placed at P on a horizontal disc which has its centre at O. The disc rotates anti-clockwise about a vertical axis through O with constant angular speed.



Which one of the following describes the force which keeps the mass at rest relative to the disc when in the position shown?

- A the weight of the mass
- B a frictional force from P to Q
- C a frictional force directed away from O
- D a frictional force directed towards O

(Total 1 mark)

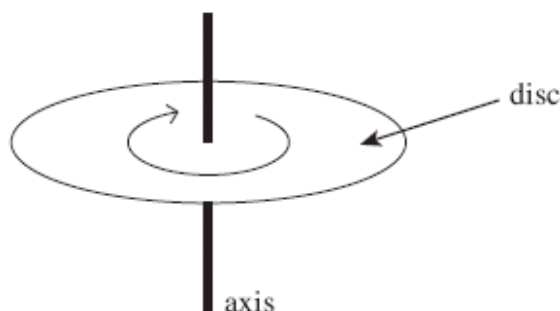
Q5. An object of mass m moves in a circle of radius r . It completes n revolutions every second.

What is the kinetic energy of the object?

- A $\frac{mn^2r^2}{8\pi^2}$
- B $\frac{mn^2r^2}{4\pi^2}$
- C $2m\pi^2n^2r^2$
- D $4m\pi^2n^2r^2$

(Total 1 mark)

- Q6.** The diagram shows a disc of diameter 120 mm that can turn about an axis through its centre.



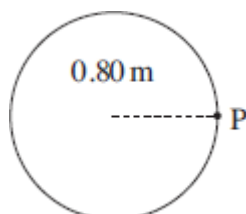
The disc is turned through an angle of 30° in 20 ms.

What is the average speed of a point on the edge of the disc during this time?

- | | | |
|----------|---------------------------|--------------------------|
| A | $0.5\pi \text{ m s}^{-1}$ | <input type="checkbox"/> |
| B | $\pi \text{ m s}^{-1}$ | <input type="checkbox"/> |
| C | $1.5\pi \text{ m s}^{-1}$ | <input type="checkbox"/> |
| D | $2\pi \text{ m s}^{-1}$ | <input type="checkbox"/> |

(Total 1 mark)

- Q7.** A model car moves in a circular path of radius 0.80 m at an angular speed of $\frac{\pi}{2} \text{ rad s}^{-1}$.



What is its displacement from point P 6.0 s after passing P?

- | | | |
|----------|--------------------|--------------------------|
| A | zero | <input type="checkbox"/> |
| B | $0.4\pi \text{ m}$ | <input type="checkbox"/> |
| C | 1.6 m | <input type="checkbox"/> |
| D | $1.6\pi \text{ m}$ | <input type="checkbox"/> |

(Total 1 mark)

10 minutes on: 52 Centripetal Acceleration

- Q1.** A helicopter circles continuously at a constant speed around a horizontal path of diameter 800 m, taking 5.0 minutes to complete each orbit of the path.

What are the speed v and the centripetal acceleration a of the helicopter?

	$v / \text{m s}^{-1}$	$a / \text{m s}^{-2}$	
A	0.021	0.18	<input type="radio"/>
B	8.4	0.088	<input type="radio"/>
C	8.4	0.18	<input type="radio"/>
D	17	0.35	<input type="radio"/>

(Total 1 mark)

- Q2.** A particle travels at a constant speed around a circle of radius r with centripetal acceleration a .

What is the time taken for ten complete rotations?

- A** $\frac{\pi}{5} \sqrt{\frac{a}{r}}$
- B** $\frac{\pi}{5} \sqrt{\frac{r}{a}}$
- C** $20\pi \sqrt{\frac{a}{r}}$
- D** $20\pi \sqrt{\frac{r}{a}}$

(Total 1 mark)

- Q3.** What is the centripetal acceleration of a point on the Earth's equator as it spins on its axis?

- A** $7.3 \times 10^{-5} \text{ m s}^{-2}$
- B** $3.4 \times 10^{-2} \text{ m s}^{-2}$
- C** 1.2 m s^{-2}
- D** 460 m s^{-2}

(Total 1 mark)

Q4. What is the centripetal acceleration of a rubber of a car wheel of diameter 0.400 m when the speed of the car is 108 km h⁻¹?

- A** 2250 m s⁻²
- B** 4500 m s⁻²
- C** 29200 m s⁻²
- D** 58300 m s⁻²

(Total 1 mark)

Q5. The mean radius of the Earth's orbit around the Sun is 1.5×10^8 km. What is the mean centripetal acceleration of the Earth about the Sun?

1 year = 3.15×10^7 s

- A** 6.0×10^{-6} m s⁻²
- B** 6.0×10^{-3} m s⁻²
- C** 3.0×10^1 m s⁻²
- D** 6.0×10^{-4} m s⁻²

(Total 1 mark)

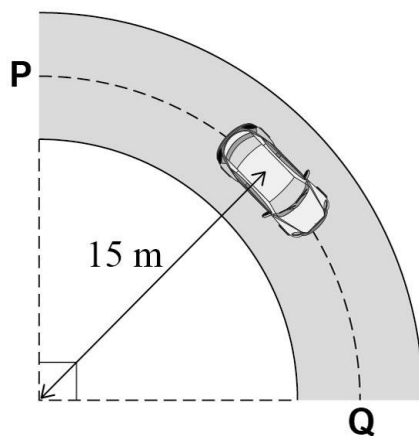
Q6. The wheel of the London Eye has a diameter of 130 m and rotates at a steady speed, completing one rotation every 30 minutes. What is the centripetal acceleration of a person in a capsule at the rim of the wheel?

What is the maximum value of its kinetic energy?

- A** 1.2×10^{-4} m s⁻²
- B** 2.5×10^{-4} m s⁻²
- C** 3.9×10^{-4} m s⁻²
- D** 7.9×10^{-4} m s⁻²

(Total 1 mark)

- Q7.** A car of mass 1200 kg travels at a constant speed around a horizontal circular bend of radius 15 m.



The car travels from P to Q in 1.8 s.

What is the centripetal acceleration of the car?

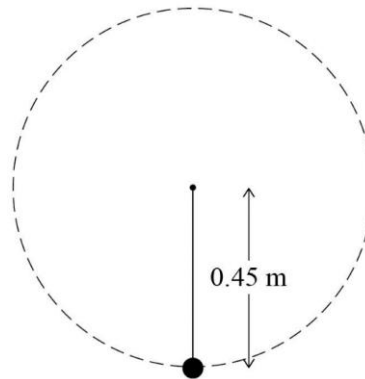
- | | | |
|----------|------------------------|-----------------------|
| A | 180 m s ⁻² | <input type="radio"/> |
| B | 11 m s ⁻² | <input type="radio"/> |
| C | 4.7 m s ⁻² | <input type="radio"/> |
| D | 0.83 m s ⁻² | <input type="radio"/> |

(Total 1 mark)

10 minutes on: 53 Centripetal Force

Q1. A bob of mass 0.50 kg is suspended from the end of a piece of string 0.45 m long.

The bob is rotated in a vertical circle at a constant rate of 120 revolutions per minute.

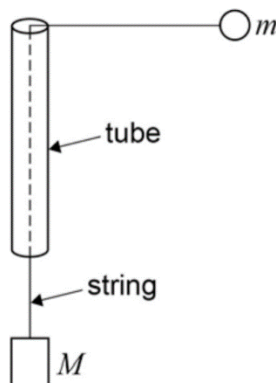


What is the tension in the string when the bob is at the bottom of the circle?

- | | | |
|----------|-------|--------------------------|
| A | 5.8 N | <input type="checkbox"/> |
| B | 31 N | <input type="checkbox"/> |
| C | 36 N | <input type="checkbox"/> |
| D | 40 N | <input type="checkbox"/> |

(Total 1 mark)

- Q2.** A string passes through a smooth thin tube. Masses m and M are attached to the ends of the string. The tube is moved so that the mass m travels in a horizontal circle of constant radius r and at constant speed v .



Which of the following expressions is equal to M ?

- A** $\frac{mv^2}{2r}$
- B** mv^2rg
- C** $\frac{mv^2}{rg}$
- D** $\frac{mv^2g}{r}$

(Total 1 mark)

- Q3.** A young child of mass 20 kg stands at the centre of a uniform horizontal platform which rotates at a constant angular speed of 3.0 rad s^{-1} .

The child begins to walk radially outwards towards the edge of the platform.

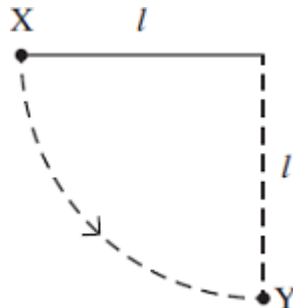
The maximum frictional force between the child and the platform is 200 N.

What is the maximum distance from the centre of the platform to which the child could walk without the risk of slipping?

- A** 1.1 m
- B** 1.3 m
- C** 1.5 m
- D** 1.7 m

(Total 1 mark)

- Q4.** A ball of mass m , which is fixed to the end of a light string of length l , is released from rest at X. It swings in a circular path, passing through the lowest point Y at speed v .

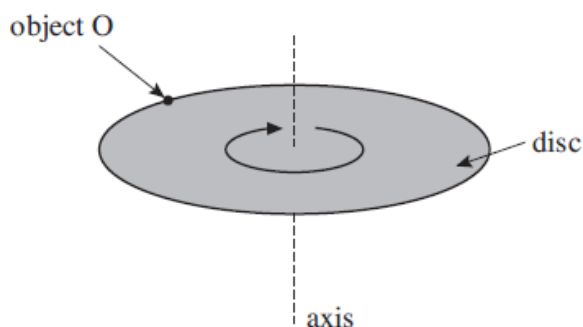


If the tension in the string at Y is T , which one of the following equations represents a correct application of Newton's laws of motion to the ball at Y?

- A** $T = \frac{mv^2}{l} - mg$
- B** $mg - T = \frac{mv^2}{l}$
- C** $T - mg = \frac{mv^2}{l}$
- D** $T + \frac{mv^2}{l} = mg$

(Total 1 mark)

- Q5.** A disc of diameter D is turning at a steady angular speed at frequency f about an axis through its centre.



What is the centripetal force on a small object O of mass m on the perimeter of the disc?

- A** $2\pi m f D$
- B** $2\pi m f^2 D$
- C** $2\pi^2 m f^2 D$
- D** $2\pi m f^2 D^2$

(Total 1 mark)

- Q6.** A ball of mass 0.30 kg is attached to a string and moves in a **vertical** circle of radius 0.60 m at a constant speed of 5.0 m s^{-1} .

Which line, A to D, in the table gives the correct values of the minimum and maximum tension in the string?

	Minimum tension / N	Maximum tension / N	
A	2.5	5.4	<input type="checkbox"/>
B	6.7	9.6	<input type="checkbox"/>
C	13	13	<input type="checkbox"/>
D	9.6	15	<input type="checkbox"/>

(Total 1 mark)

Q7. A ball of mass 0.2 kg moves in a horizontal circle of radius 50 cm at the end of a string.

The ball moves at a constant speed of 9.0 m s^{-1} .

What is the horizontal force exerted by the ball on the string?

- A 8 N away from the centre of the circle
- B 8 N towards from the centre of the circle
- C 32 N away from the centre of the circle
- D 32 N towards from the centre of the circle

(Total 1 mark)

10 Minutes on: 39 Circuit Basics

- Q1. B
- Q2. C
- Q3. B
- Q4. C
- Q5. B
- Q6. C
- Q7. C

10 Minutes on: 40 I-V Graphs

- Q1. C
- Q2. C
- Q3. A
- Q4. A
- Q5. B
- Q6. B
- Q7. C

10 Minutes on: 41 Resistivity

- Q1. C
- Q2. B
- Q3. B
- Q4. D
- Q5. B
- Q6. A
- Q7. B

10 Minutes on: 42 Resistance and Temperature

- Q1. C
- Q2. C
- Q3. B
- Q4. C
- Q5. A
- Q6. B
- Q7. A

10 minutes on: 43 Resistors in Series and Parallel

- Q1. C
- Q2. B
- Q3. A
- Q4. B
- Q5. D
- Q6. B
- Q7. B

10 minutes on: 44 Series and Parallel Circuits

- Q1. D
- Q2. D
- Q3. D
- Q4. B
- Q5. A
- Q6. B
- Q7. D

10 minutes on: 45 Potential Dividers Basics

- Q1. B
- Q2. A
- Q3. A
- Q4. D
- Q5. C
- Q6. B
- Q7. B

10 minutes on: 46 Sensing Circuits

- Q1. D
- Q2. B
- Q3. D
- Q4. D
- Q5. A
- Q6. B
- Q7. D

10 minutes on: 47 EMF and Internal Resistance

- Q1. D
- Q2. D
- Q3. A
- Q4. D
- Q5. C
- Q6. B
- Q7. C

10 minutes on: 48 Cells in Series and Parallel

- Q1. B
- Q2. A
- Q3. D
- Q4. A
- Q5. A
- Q6. C
- Q7. A

10 minutes on: 49 Electrical Energy

- Q1. C
- Q2. C
- Q3. B
- Q4. C
- Q5. B
- Q6. B
- Q7. D

10 minutes on: 50 Electrical Power

- Q1. D
- Q2. C
- Q3. D
- Q4. B
- Q5. B
- Q6. D
- Q7. B

10 minutes on: 51 Circular Motion

- Q1. D
- Q2. C
- Q3. A
- Q4. D
- Q5. C
- Q6. A
- Q7. C

10 minutes on: 52 Centripetal Acceleration

- Q1. C
- Q2. D
- Q3. B
- Q4. B
- Q5. B
- Q6. D
- Q7. B

10 minutes on: 53 Centripetal Force

- Q1. D
- Q2. C
- Q3. A
- Q4. C
- Q5. C
- Q6. D
- Q7. C