Practice Question Set For A-Level
Subject : Physics
Paper-1 Topic : 3_ElectricCircuits

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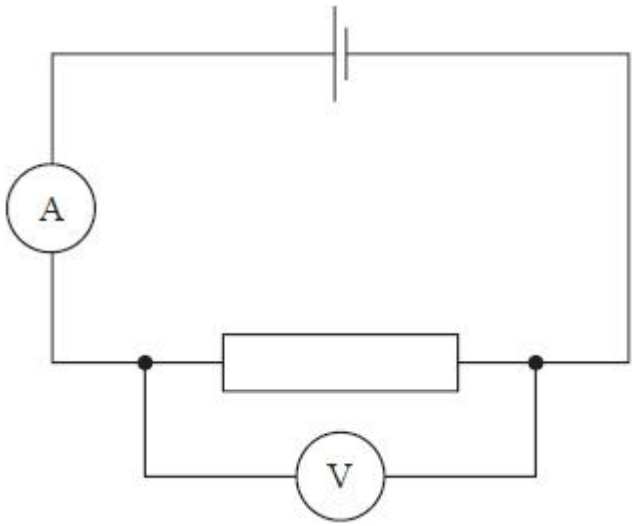
Name of the Student:_____
Max. Marks : 20 Marks **Time : 20 Minutes**

Q1.

Answer the question with a cross in the box you think is correct ☒ . If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒ .

The circuit shown contains a cell with internal resistance.



The cell is replaced with another cell, with the same e.m.f. but greater internal resistance.

Which row of the table shows what happens to the ammeter reading and voltmeter reading?

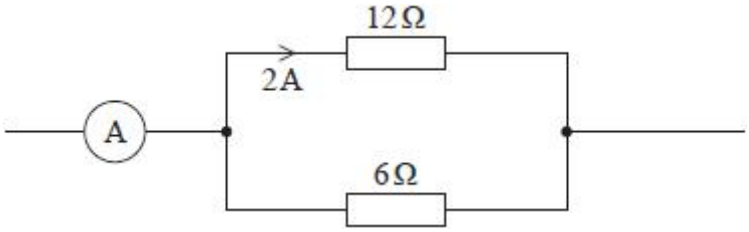
		Ammeter reading	Voltmeter reading
☐	**A**	increases	increases
☐	**B**	increases	decreases
☐	**C**	decreases	increases
☐	**D**	decreases	decreases

(Total for question = 1 mark)

Q2.

Answer the question with a cross in the box you think is correct (☒). If you change your mind about an answer, put a line through the box (☒) and then mark your new answer with a cross (☒).

Part of an electric circuit is shown.



What is the current shown by the ammeter?

- **A** 3 A
- **B** 4 A
- **C** 5 A
- **D** 6 A

(Total for question = 1 mark)

Q3.

A rechargeable cell stores a maximum energy of 4200 J. The cell has an e.m.f. of 1.5 V and after 2.0 hours use the cell is completely discharged.

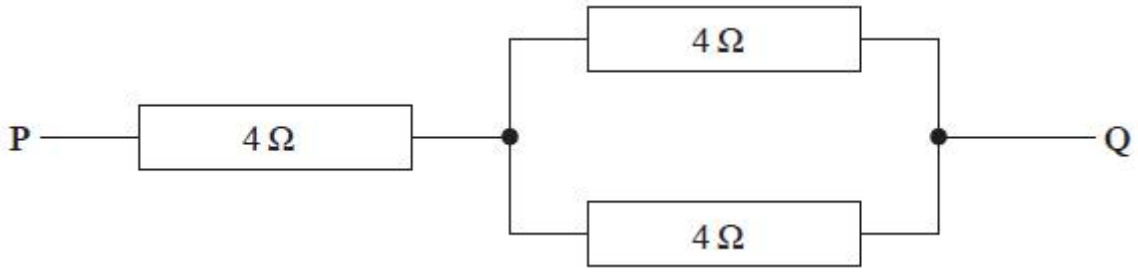
Assuming the e.m.f. stays constant, the charge passing through the cell during this time is

- **A** 1400 C
- **B** 2800 C
- **C** 5600 C
- **D** 6300 C

(Total for question = 1 mark)

Q4.

The diagram shows a combination of three identical resistors.



What is the combined resistance between P and Q?

- **A** 4 Ω

☒ **B** 6 Ω

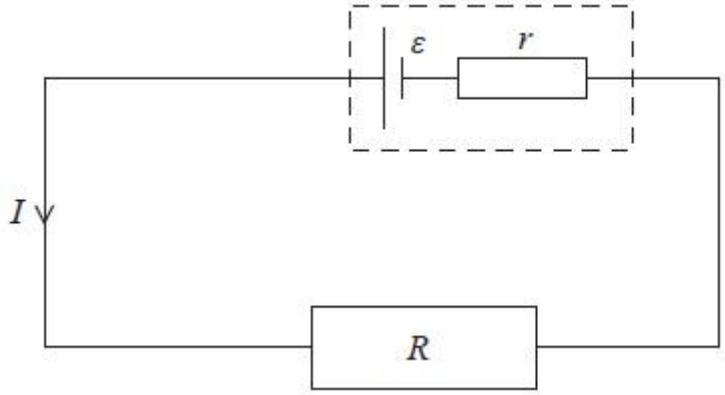
☒ **C** 8 Ω

☒ **D** 12 Ω

(Total for question = 1 mark)

Q5.

The diagram represents a resistor of resistance *R* in a series circuit with a cell of e.m.f. *ε* and internal resistance *r*.



Which of the following correctly gives the potential difference *V* across the internal resistance?

☐ **A** $V = \frac{\varepsilon(R + r)}{r}$

☐ **B** $V = \frac{\varepsilon R}{R + r}$

☐ **C** $V = \frac{\varepsilon(R + r)}{R}$

☐ **D** $V = \frac{\varepsilon r}{(R + r)}$

(Total for question = 1 mark)

Q6.

When a semiconductor has its temperature increased from room temperature, its resistance usually decreases because

☒ **A** the electrons are moving faster.

☒ **B** the lattice atoms vibrate with greater amplitude.

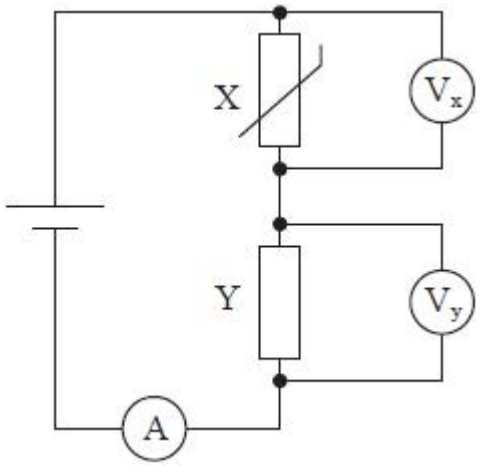
☒ **C** the lattice atoms vibrate with smaller amplitude.

☒ **D** the number of charge carriers per unit volume increases.

(Total for Question = 1 mark)

Q7.

The diagram shows a potential divider circuit that contains a negative temperature coefficient thermistor.



The temperature of the room containing the circuit increases.

Select the row of the table that correctly shows the changes in readings on the meters.

	V_x	V_y	A
☒ **A**	decrease	increase	decrease
☒ **B**	decrease	increase	increase
☒ **C**	increase	decrease	decrease
☒ **D**	increase	decrease	increase

(Total for question = 1 mark)

Q8.

A hair dryer is used for 3 minutes. The operating current is 6 A.

What charge flows in this time?

(1)

☒ **A** 0.03 C

☒ **B** 2 C

☒ **C** 18 C

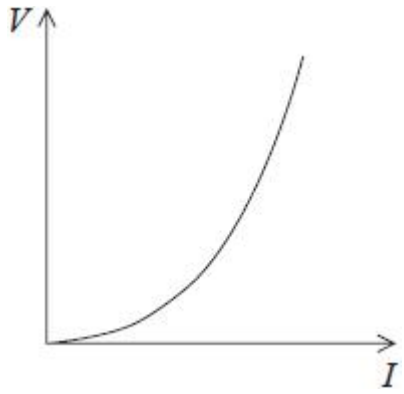
☒ **D** 1080 C

(Total for question = 1 mark)

Q9.

Answer the question with a cross in the box you think is correct (☒). If you change your mind about an answer, put a line through the box (☒) and then mark your new answer with a cross (☒).

The graph shows how the potential difference *V* varies with the current *I* for a circuit component.



Which of the following could be the circuit component?

- ☐ **A** diode
- ☐ **B** filament bulb
- ☐ **C** ohmic resistor
- ☐ **D** thermistor

(Total for question = 1 mark)

Q10.

A light dependent resistor and a negative temperature coefficient thermistor are connected in series.

Which of the following combinations of illumination and temperature will result in the highest combined resistance?

(1)

- ☐ **A** dark and cold
- ☐ **B** dark and hot
- ☐ **C** light and cold
- ☐ **D** light and hot

(Total for question = 1 mark)

Q11.

A student is deriving an equation for the total resistance of resistors in series.

She writes the following steps but does not justify them.

Step 1 $V = V_1 + V_2$
Step 2 *but* $V = IR$
Step 3 *so* $IR = I_1R_1 + I_2R_2$
Step 4 *but* $I = I_1 = I_2$
Step 5 *Therefore* $R = R_1 + R_2$

Which step is justified using conservation of charge?

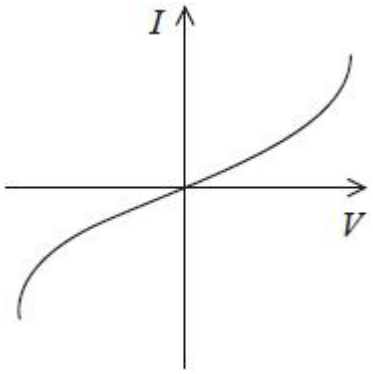
(1)

- ☒ **A** Step 1
- ☒ **B** Step 2
- ☒ **C** Step 3
- ☒ **D** Step 4

(Total for question = 1 mark)

Q12.

The diagram shows a graph of current *I* against potential difference *V* for an electrical component.



Which of the following components would produce a graph of this shape?

- ☒ **A** filament bulb
- ☒ **B** metallic conductor
- ☒ **C** negative temperature coefficient thermistor
- ☒ **D** ohmic conductor

(Total for question = 1 mark)

Q13.

Answer the question with a cross in the box you think is correct (☒). If you change your mind about an answer, put a line through the box (☒) and then mark your new answer with a cross (☒).

A cell is connected across a resistor. After a while the internal resistance of the cell increases.

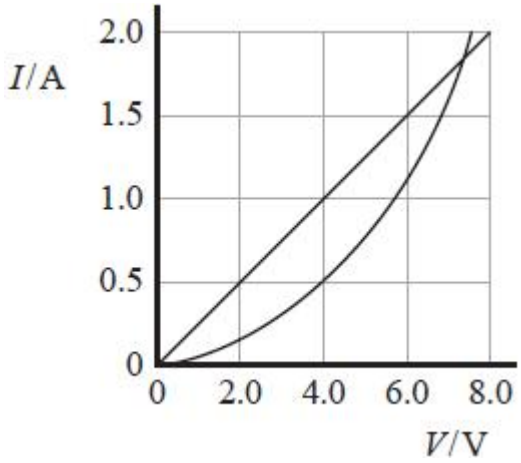
Which row of the table correctly shows the change in the current in the circuit and the change in the terminal potential difference across the cell?

	Current	Terminal potential difference
☐ A	decreases	decreases
☐ B	decreases	increases
☐ C	increases	decreases
☐ D	increases	increases

(Total for question = 1 mark)

Q14.

The current-potential difference graphs for a resistor and a thermistor are shown.



The resistor and thermistor are connected in series to a 6 V battery.

What is the current, in amps, in the resistor?

(1)

☐ **A** 0.5

☐ **B** 1.0

☐ **C** 1.5

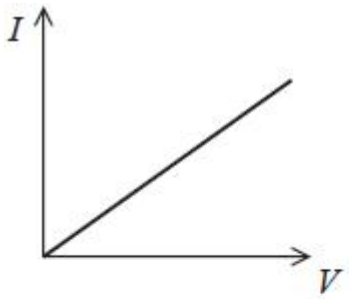
☐ **D** 2.0

(Total for question = 1 mark)

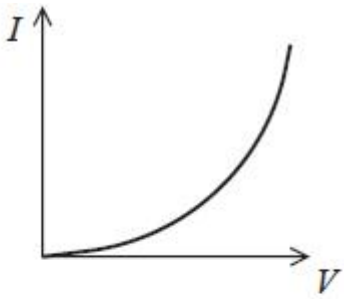
Q15.

Answer the question with a cross in the box you think is correct ☒. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

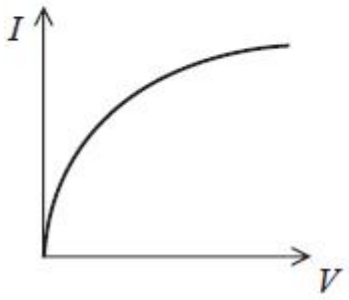
Which of the following graphs shows how the current *I* through a thermistor varies with the potential difference *V* across the thermistor?



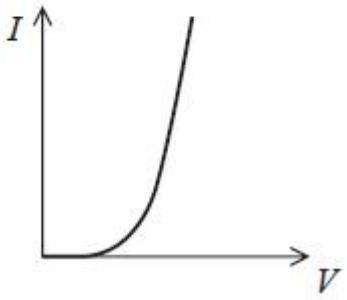
A



B



C



D

☒ **A**

☒ **B**

☒ **C**

☒ **D**

(Total for question = 1 mark)

Q16.

The current in a filament lamp is 250 mA.

How much charge flows through the lamp in 3 minutes?

☒ **A** 0.75 C

☒ **B** 45 C

☒ **C** 750 C

☒ **D** 45 000 C

(Total for question = 1 mark)

Q17.

A volt can be defined as a

(1)

- ☒ **A** coulomb per joule.
- ☒ **B** coulomb per second.
- ☒ **C** joule per coulomb.
- ☒ **D** joule per second.

(Total for question = 1 mark)

Q18.

Resistivity can be described correctly as

- ☒ **A** resistance of a unit length.
- ☒ **B** resistance per unit area.
- ☒ **C** resistance per unit volume.
- ☒ **D** resistance of a unit cube.

(Total for question = 1 mark)

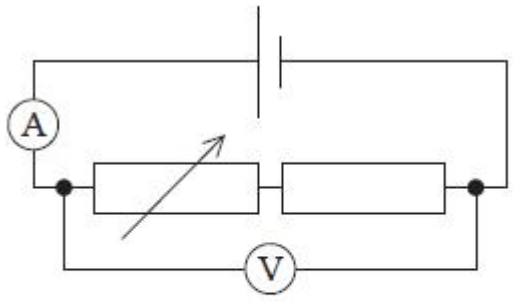
Q19.

Answer the question with a cross in the box you think is correct (☒). If you change your mind about an answer, put a line through the box (☒) and then mark your new answer with a cross (☒).

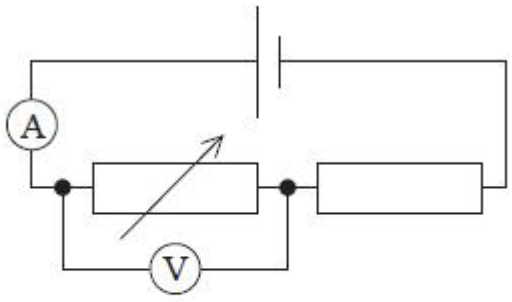
A student carried out an experiment to determine the electromotive force (e.m.f.) of a cell. The current in a circuit was changed by adjusting a variable resistor. A graph was plotted of the voltmeter reading on the *y*-axis against the ammeter reading on the *x*-axis.

Using the data obtained, the value of the intercept on the *y*-axis was the e.m.f. of the cell.

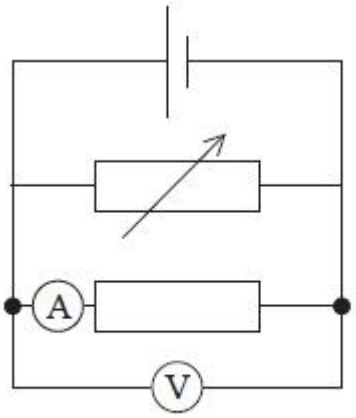
Which of the following circuits should have been used?



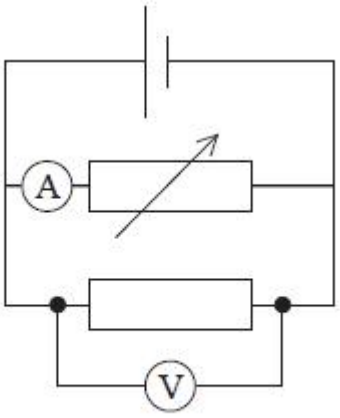
A



B



C



D

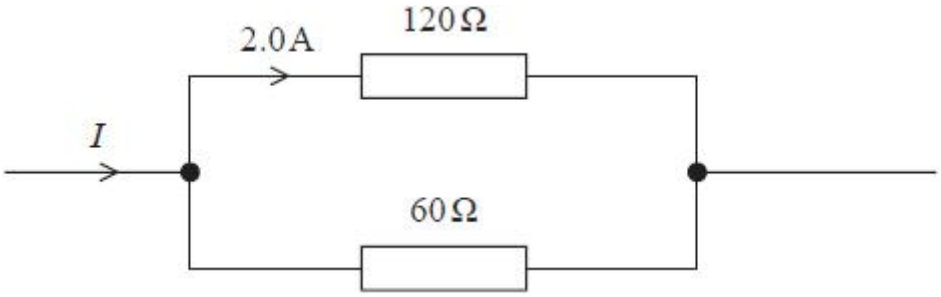
☒ **A**
☒ **B**
☒ **C**
☒ **D**

(Total for question = 1 mark)

Q20.

Answer the question with a cross in the box you think is correct ☒. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

Two resistors are connected in parallel and the current in one of them is 2.0 A, as shown.



Which of the following is the current *I* in ampere?

☒ **A** 3.0

☒ **B** 4.0

☒ **C** 5.0

☒ **D** 6.0

(Total for question = 1 mark)