Pearson Edexcel GCE Physics

Additional Support Worksheets

The A Level Physics worksheet series are designed to provide support to students in grasping foundational level knowledge of key terms and concepts. By engaging with these materials, students can build strong foundations in key principles. The series encourages active learning through thought provoking questions, so learners can reflect on their understanding and boost confidence.

Contents

Electric Circuits

For questions 1-200, select one answer from A to D and put a cross in the box [x]. If you change your mind, put a line through the box ~~[x]~~ and then mark your new answer with a cross [x].

1 A wire of length L and cross-sectional area A has resistance R.

A second length of wire has a length $2L$ and cross-sectional area $2A$.

Which of the following gives the new resistance?

[x] **A** $R/2$

[x] **B** R

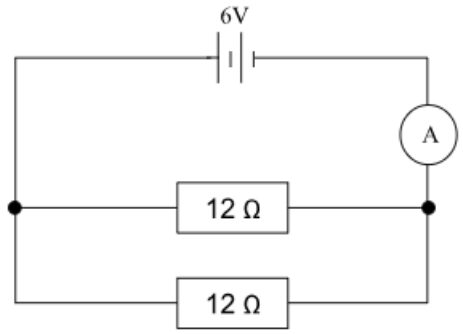
[x] **C** $2R$

[x] **D** $4R$

(Total for Question 1 = 1 mark)

---

2 A student connects two 12 Ω resistors in parallel across a 6 V supply, as shown.



.

Which of the following gives the reading on the ammeter?

[x] **A** 0.25 A

[x] **B** 0.5 A

[x] **C** 1 A

[x] **D** 2 A

(Total for Question 2 = 1 mark)

---

3 Which of the following is a correct statement for the drift velocity v in a current carrying wire?

[x] **A** v is proportional to current and cross-sectional area

[x] **B** v is proportional to current and inversely proportional to cross-sectional area

[x] **C** v is proportional to electron charge and inversely proportional to current

[x] **D** v is proportional to charge carrier density and inversely proportional to current

(Total for Question 3 = 1 mark)

---

4 The power of a car headlamp is stated as 48 W.

Which of the following is the current in the headlamp when connect to a 12 V power supply?

[x] **A** 0.25 A

[x] **B** 2.0 A

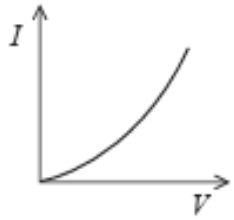
[x] **C** 4 A

[x] **D** 8 A

(Total for Question 4 = 1 mark)

---

5 Which electrical component has the current-potential difference graph shown?



Which of the following is the electrical component?

[x] **A** filament lamp

[x] **B** resistor

[x] **C** diode

[x] **D** negative temperature coefficient thermistor

(Total for Question 5 = 1 mark)

---

6 Two copper wires of same cross sectional area are placed in a series circuit.

Which of the following could be different for the two wires?

[x] **A** charge carrier density in each wire

[x] **B** current in each wire

[x] **C** drift velocity in each wire

[x] **D** potential difference across each length of wire

(Total for Question 6 = 1 mark)

---

7 A wire of resistivity $\rho = 1.0 \times 10^{-6}\ \Omega\ \text{m}$ and cross-sectional area $2.0 \times 10^{-6}\text{m}^2$ has resistance $R = 4.0\ \Omega$.

Which of the following expressions gives the length l of the wire in m?

[x] **A** 0.08

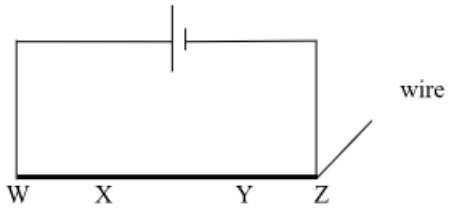
[x] **B** 80

[x] **C** 0.8

[x] **D** 8.0

(Total for Question 7 = 1 mark)

8 A uniform straight wire of length l is connected to potential difference, as shown.



Which point will be at the greatest electric potential?

[x] **A** W

[x] **B** X

[x] **C** Y

[x] **D** Z

(Total for Question 8 = 1 mark)

9 The formula for the current I in a conductor is $I = nqvA$.

Which of the following gives the meaning of n?

[x] **A** number of conduction electrons in a wire of length 1 m

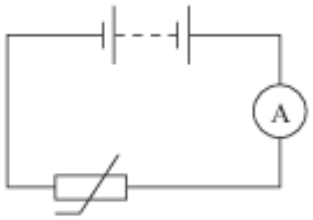
[x] **B** number of conduction electrons in 1 m^3 of a material

[x] **C** total number of electrons in a wire of length 1 m

[x] **D** total number of electrons in 1 m^3 of a material

(Total for Question 9 = 1 mark)

10 The circuit includes a thermistor.



Which of the following explains the change in the ammeter reading as the temperature of the thermistor increases?

[x] **A** The number of conduction electrons decreases so the ammeter reading decreases

[x] **B** The number of conduction electrons decreases so the ammeter reading increases.

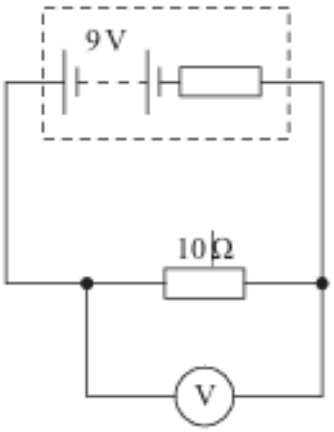
[x] **C** The number of conduction electrons increases so the ammeter reading decreases.

[x] **D** The number of conduction electrons increases so the ammeter reading increases.

(Total for Question 10 = 1 mark)

---

11 A student connected a circuit using a battery of e.m.f. 9 V with internal resistance, as shown circuit.



The reading on the voltmeter was 6V.

Which of the following expressions gives the internal resistance of the battery in Ω?

[x] **A** 5.0

[x] **B** 1.8

[x] **C** 0.55

[x] **D** 0.20

(Total for Question 11 = 1 mark)

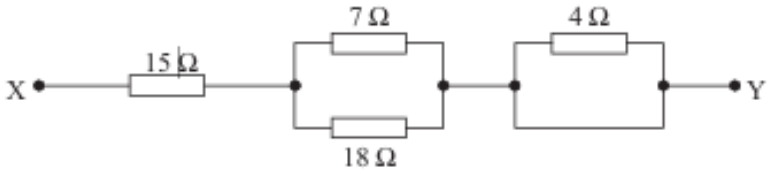
12 A current in a wire causes the temperature of the wire to increase.

Which row of the table describes the changes to the wire as the temperature increases?

	Amplitude of lattice vibrations in the wire	Resistance of the wire	Frequency of collisions of electrons and lattice
[x] **A**	decreases	decreases	decreases
[x] **B**	increases	increases	increases
[x] **C**	increases	decreases	increases
[x] **D**	decreases	decreases	decreases

(Total for Question 12 = 1 mark)

13 Four resistors are connected between points X and Y, as shown.



Which of the following gives the total resistance, in ohms, between X and Y?

[x] **A** 15.20

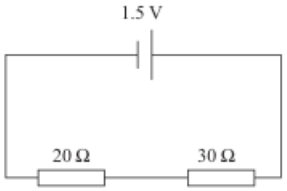
[x] **B** 19.20

[x] **C** 20.04

[x] **D** 20.30

(Total for Question 13 = 1 mark)

14 A circuit is connected, as shown. The cell has negligible internal resistance.



Which of the following gives the power, in W, transferred by the 20 Ω resistor?

[x] **A** 0.030

[x] **B** 0.018

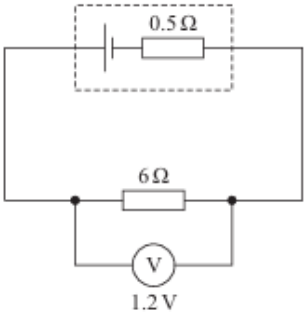
[x] **C** 0.600

[x] **D** 0.630

(Total for Question 14 = 1 mark)

---

15 The circuit shown includes a cell with an internal resistance of 0.5 Ω.



Which of the following expressions gives the e.m.f. of the cell in V?

[x] **A** 1.10

[x] **B** 1.20

[x] **C** 1.30

[x] **D** 3.70

(Total for Question 15 = 1 mark)

---

16 The resistance of which of the following electrical components will decrease as the applied potential difference increases?

[x] **A** diode **and** ohmic conductor

[x] **B** ohmic conductor **and** filament lamp

[x] **C** negative temperature coefficient thermistor **and** diode

[x] **D** negative temperature coefficient thermistor **and** filament lamp

(Total for Question 16 = 1 mark)

17 Which of the following is an SI unit for e.m.f.?

[x] **A** A

[x] **B** J

[x] **C** J C

[x] **D** J C^{-1}

(Total for Question 17 = 1 mark)

18 The cross-sectional area of a copper wire is 5.0×10^{-7} m^2. There is a current of 0.93 A in the wire. Copper has 8.4×10^{28} conduction electrons per m^3.

Which of the following gives the drift velocity in ms^{-1} for the conduction electrons in the wire?

[x] **A** 2.21×10^{-23}

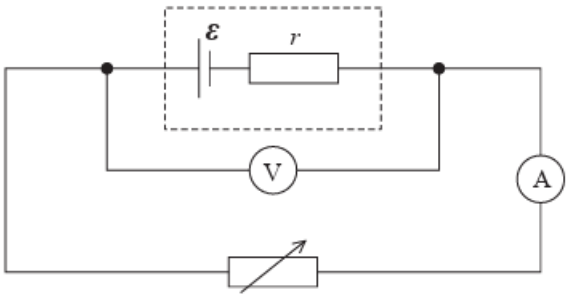
[x] **B** 7.23×10^{3}

[x] **C** 4.57×10^{22}

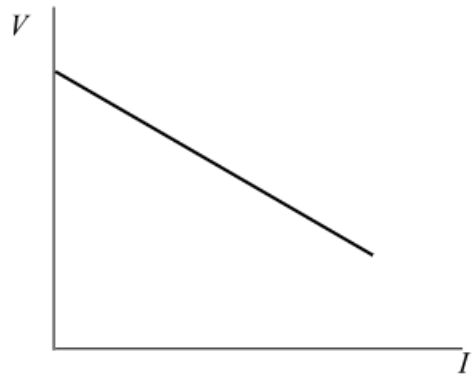
[x] **D** 1.39×10^{-4}

(Total for Question 18 = 1 mark)

19 The circuit shown is used to determine the internal resistance *r* and e.m.f. of a cell.



The variable resistor is adjusted and corresponding values of *V* and *I* were taken. A graph of *V* against *I* was plotted.



Which of the following statements is correct?

[x] **A** The area underneath the graph is the total energy dissipated in the cell

[x] **B** The gradient of the graph is $+r$

[x] **C** The graph shows that V and I are directly proportional

[x] **D** The intercept on the V axis of the graph is ε

(Total for Question 19 = 1 mark)

---

20 The unit of resistance is the ohm.

Which of the following is equivalent to the ohm?

[x] **A** $\mathrm{J\,C^{-2}\,s}$

[x] **B** $\mathrm{J\,C^{2}\,s^{-1}}$

[x] **C** $\mathrm{J\,C^{-1}\,s^{-1}}$

[x] **D** $\mathrm{J\,C\,s}$

(Total for Question 20 = 1 mark)
