

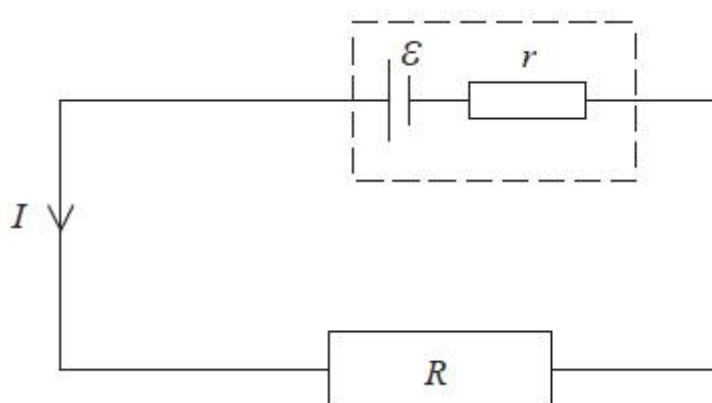
Name of the Student: _____

Max. Marks : 20 Marks

Time : 20 Minutes

Q1.

The diagram shows a resistor of resistance R across a cell of e.m.f. $\mathcal{E}$ and internal resistance r .



Which of the following is a correct expression for the current I ?

- ☐ **A** $I = \mathcal{E} / r$
- ☐ **B** $I = \mathcal{E} / R$
- ☐ **C** $I = \mathcal{E} / (R + r)$
- ☐ **D** $I = \mathcal{E} / (R - r)$

(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 ☒.

The intensity of light incident on a light dependent resistor (LDR) can vary both its electrical resistance R and the number of charge carriers per unit volume n . The light intensity on an LDR is increased.

Which row of the table describes the effect on R and n ?

	R	n
☐ A	decreases	decreases
☐ B	decreases	increases
☐ C	increases	decreases
☐ D	increases	increases

(Total for question = 1 mark)

Q3.

An electric motor with potential difference V and current I lifts a mass m through a height h in time t at a steady speed v .

The efficiency of the motor is given by

- ☐ A $\frac{\frac{1}{2}mv^2}{VIt}$
- ☐ B $\frac{VI}{mg}$
- ☐ C $\frac{VIt}{mv}$
- ☐ D $\frac{mgh}{VIt}$

(Total for Question = 1 mark)

Q4.

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 length of wire has a non-uniform cross-sectional area. There is an electric current in the wire.

Which of the following is **not** constant along the length of this wire?

- ☐ A electric current
- ☐ B electron charge
- ☐ C electron drift velocity
- ☐ D number of free electrons per unit volume

Q5.

Which of the following correctly defines electromotive force?

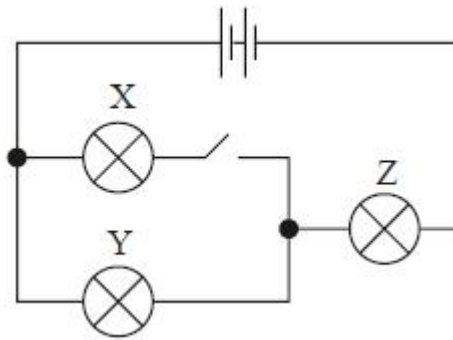
(1)

- ☐ A Force per unit charge to move a charge across a component.
- ☐ B Force per unit charge to move a charge around a circuit.
- ☐ C Work done per unit charge to move a charge across a component.
- ☐ D Work done per unit charge to move a charge around a circuit.

(Total for question = 1 mark)

Q6.

A circuit consists of three identical 1.5 V bulbs connected to two 1.5 V cells.



The switch is closed.

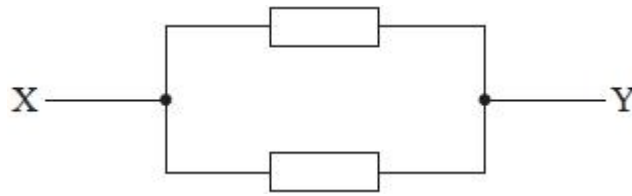
Which row describes the change in brightness of bulb Y and bulb Z?

	Y	Z
☐ A	brighter	brighter
☐ B	brighter	dimmer
☐ C	dimmer	brighter
☐ D	dimmer	dimmer

(Total for question = 1 mark)

Q7.

The two resistors shown each have resistance R .



Which expression gives the correct resistance between point X and point Y?

(1)

☐ A $\frac{R}{2}$

☐ B R

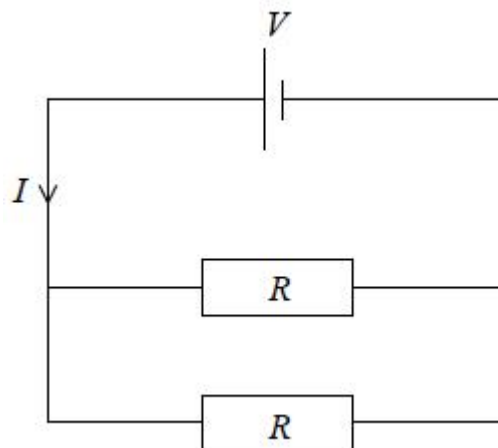
☐ C $2R$

☐ D R^2

(Total for question = 1 mark)

Q8.

A potential difference, V , is applied to two resistors in parallel, each of resistance R .
A current, I , flows through the whole circuit.



The correct expression for the power developed in each resistor is given by

☐ A $P = IV$

☐ B $P = IV/4$

☐ C $P = V^2/2R$

☐ D $P = I^2R/4$

(Total for question = 1 mark)

Q9.

The current through a wire of cross-sectional area A is I when the drift velocity of the electrons in the wire is v and the charge carrier density is n .

The wire is replaced with a wire of a different metal with half the charge carrier density but the same cross-sectional area A .

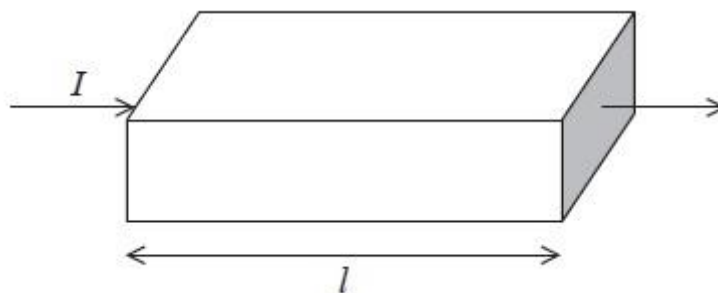
If the current in the new wire is $2I$, the drift velocity is

- ☐ **A** $v/2$
- ☐ **B** v
- ☐ **C** $2v$
- ☐ **D** $4v$

(Total for question = 1 mark)

Q10.

The diagram shows a current I flowing through a sample of material of length l and cross-sectional area A .



The drift velocity of the free electrons is v .

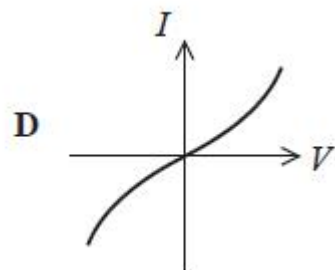
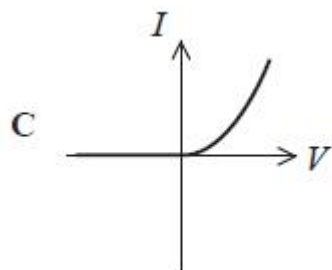
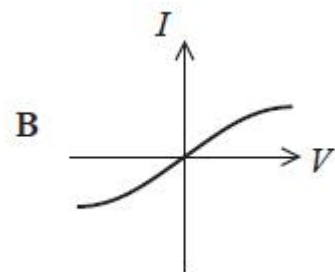
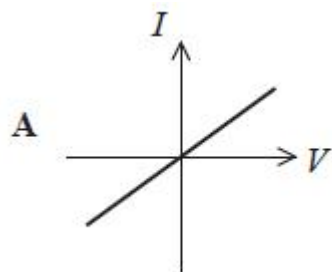
If the area and length are both doubled, but the current remains the same, the drift velocity will be

- ☐ **A** $v / 4$
- ☐ **B** $v / 2$
- ☐ **C** $2v$
- ☐ **D** $4v$

(Total for Question = 1 mark)

Q11.

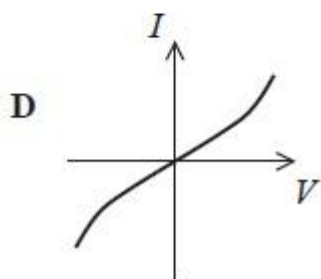
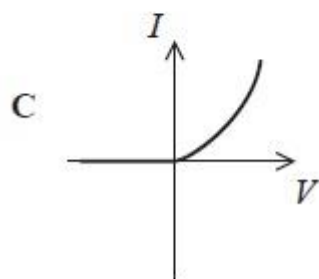
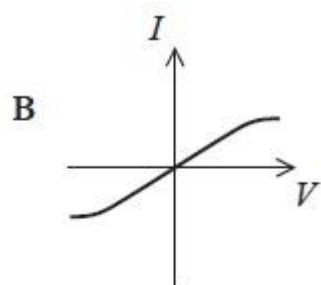
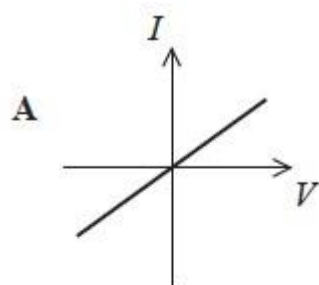
Which of the following current-potential difference (I - V) graphs correctly shows the behaviour of a diode?



- ☐ A
- ☐ B
- ☐ C
- ☐ D

(Total for question = 1 mark)

Q12.
Which of the following current – potential difference (I – V) graphs shows the correct behaviour for a filament bulb?



- ☐ A
- ☐ B

- ☐ C
☐ D

(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 constant current maintained in a copper wire causes the temperature of the wire to increase.

Which of the following does **not** increase?

- ☐ A amplitude of vibration of the lattice ions
☐ B number of conduction electrons per unit volume
☐ C rate of collision of conduction electrons with lattice ions
☐ D rate of energy transfer from conduction electrons to lattice ions

(Total for question = 1 mark)

Q14.

An electron is accelerated from rest through a potential difference of 5.0 kV.
The kinetic energy gained by the electron is

- ☐ A $8.0 \times 10^{-16} \text{ J}$
☐ B $8.0 \times 10^{-19} \text{ J}$
☐ C $3.2 \times 10^{-20} \text{ J}$
☐ D $3.2 \times 10^{-23} \text{ J}$

(Total for question = 1 marks)

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 (☐).

A light dependent resistor is connected across a cell of negligible internal resistance. The light intensity is increased.

Which of the following statements about the current is correct?

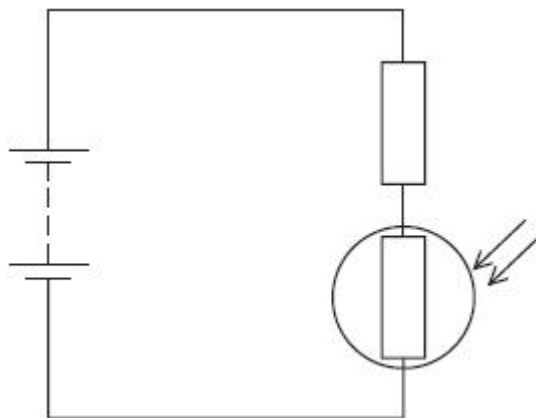
- ☐ A It decreases because there is an increase in the number of conduction electrons.
☐ B It increases because there is an increase in the number of conduction electrons.
☐ C It decreases because the amplitude of lattice vibrations decreases.
☐ D It increases because the amplitude of lattice vibrations increases.

(Total for question = 1 mark)

Q16.

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 light dependent resistor (LDR) and a resistor are connected to a battery, as shown.



The intensity of light incident on the LDR increases.

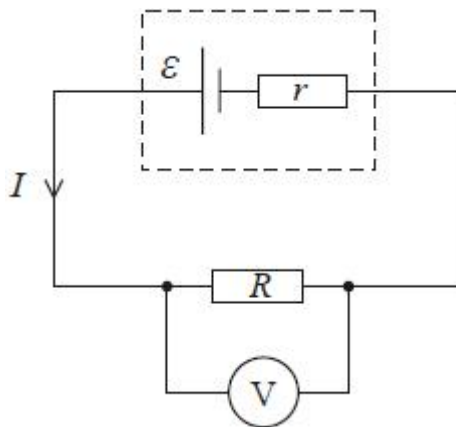
Which row of the table describes the change in the resistance of the LDR and the change in the potential difference across the resistor?

	Resistance of LDR	Potential difference across the resistor
☐ A	decreases	decreases
☐ B	decreases	increases
☐ C	increases	decreases
☐ D	increases	increases

(Total for question = 1 mark)

Q17.

A cell of e.m.f $\mathcal{E}$ and internal resistance r is connected across a fixed resistor of resistance R . There is a current I in the circuit and a potential difference V across the fixed resistor.



The term 'lost volts' refers to the difference between the e.m.f. and the terminal potential difference.

Which of the following is an expression for the lost volts?

- ☐ A $I(R + r)$
- ☐ B Ir
- ☐ C IR
- ☐ D $I(R - r)$

(Total for question = 1 mark)

Q18.

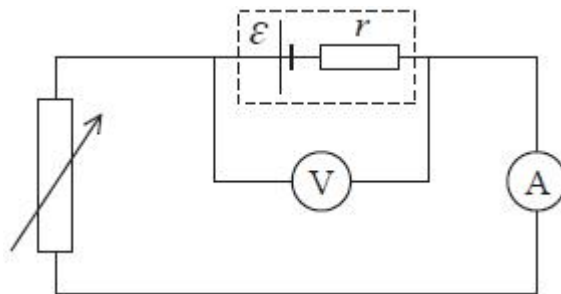
Electric current in a circuit can be considered to be

- ☐ A energy transferred per unit time.
- ☐ B the rate of flow of charge.
- ☐ C the total charge flowing.
- ☐ D work done per unit charge.

(Total for question = 1 mark)

Q19.

A cell of e.m.f. ϵ and internal resistance r is connected across a variable resistor as shown.



A student varied the current in the circuit using the variable resistor.
The current I and the corresponding potential difference V across the cell were recorded.
A graph was plotted of V against I .

Which of the following statements about the graph is correct?

	Gradient	Intercept on y -axis
☐ A	positive	r
☐ B	positive	$\mathcal{E}$
☐ C	negative	r
☐ D	negative	$\mathcal{E}$

(Total for question = 1 mark)

Q20.

A potential difference of 6V is applied across a 12Ω resistor.

What is the power supplied to the resistor?

- ☐ A 0.3W
- ☐ B 0.5W
- ☐ C 2W
- ☐ D 3W

(Total for question = 1 mark)