

# 5.2 Heating Effect of Electric Currents

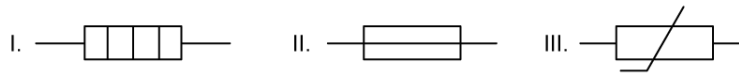
## Question Paper

Course	DPIB Physics
Section	5. Electricity & Magnetism
Topic	5.2 Heating Effect of Electric Currents
Difficulty	Easy

**Time allowed:** 20  
**Score:** /10  
**Percentage:** /100

### Question 1

Select the row which correctly identifies the three circuit symbols shown below.

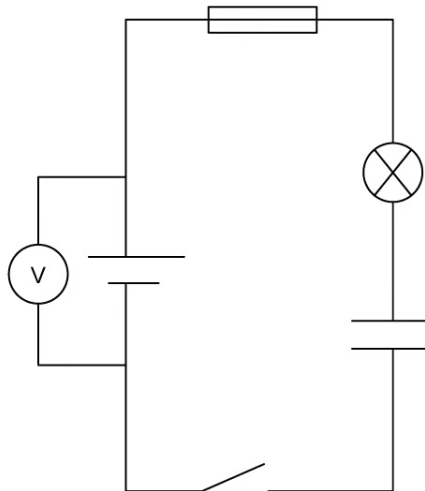


	I.	II.	III.
A.	heating element	potentiometer	variable resistor
B.	heating element	fuse	thermistor
C.	resistor	ammeter	variable resistor
D.	voltmeter	fuse	thermistor

[1 mark]

### Question 2

Identify two features of the circuit shown.



A.	a bulb is in series with a fixed resistor	current can be measured through the cell
B.	a bulb is protected by a fuse	current can be measured through the bulb
C.	a bulb is protected by a fuse	voltage can be measured across the cell
D.	a capacitor is in series with a fuse	voltage can be measured across the bulb

[1 mark]

### Question 3

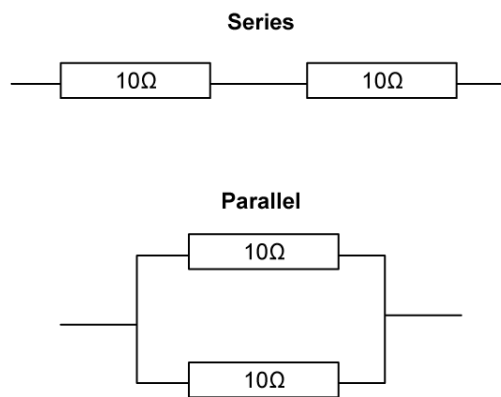
Electrons moving through a metal wire transfer some of their electric potential energy to the positive ions of the metal. Which two changes are caused by this energy transfer?

	Kinetic energy of the lattice	Resistance of the metal wire
A.	decreases	decreases
B.	decreases	increases
C.	increases	decreases
D.	increases	increases

[1 mark]

### Question 4

Two identical  $10\ \Omega$  resistors are connected first in series, and then in parallel, as shown.



Determine the correct combined resistance of each arrangement.

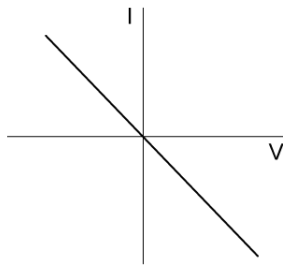
	Series	Parallel
A.	$5\ \Omega$	$20\ \Omega$
B.	$10\ \Omega$	$20\ \Omega$
C.	$20\ \Omega$	$10\ \Omega$
D.	$20\ \Omega$	$5\ \Omega$

[1 mark]

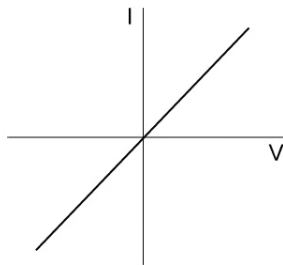
### Question 5

Select the graph which best describes the I-V characteristic of an ohmic resistor.

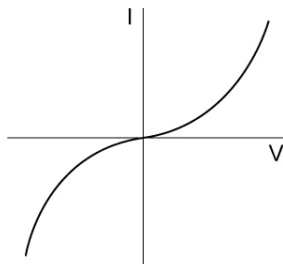
A.



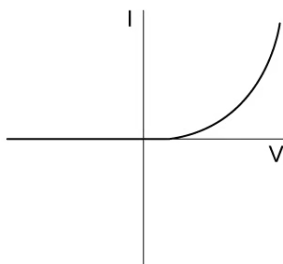
B.



C.



D.



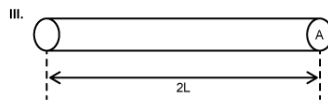
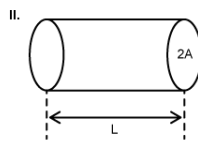
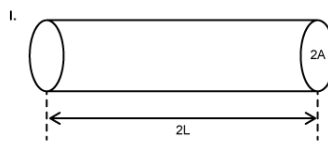
[1 mark]

**Question 6**

A wire with resistivity  $\rho$ , length  $L$  and cross-sectional area  $A$  has resistance  $R$ .



Which of the wire, made from the same material, will also have resistance  $R$ ?



- A. I only
- B. I and II
- C. II and III
- D. III only

[1 mark]

### Question 7

Which of the following statements are benefits of using parallel circuits when connecting components in homes and vehicles?

- I. A single power source supplies all lights and appliances with the same potential difference
- II. The current is the same in all branches so only one type of fuse is needed
- III. If one bulb breaks, the appliances in other branches continue to work

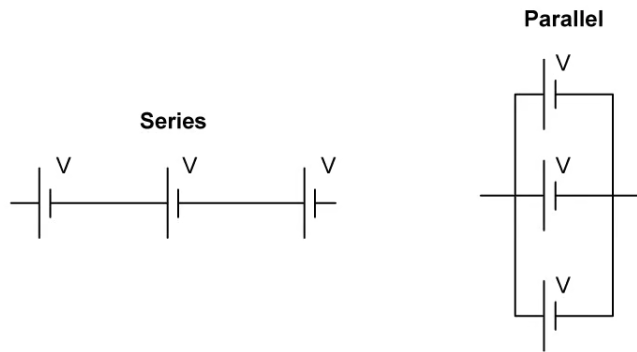
- A. I and II
- B. I and III
- C. II and III
- D. I, II and III

[1 mark]

### Question 8

A student is provided with three identical cells, each having a potential difference of  $V$ .

For the two arrangements shown, what is the total potential difference across the array?



	Series	Parallel
A.	$V$	$3V$
B.	$\frac{1}{3}V$	$3V$
C.	$3V$	$\frac{1}{3}V$
D.	$3V$	$V$

[1 mark]

**Question 9**

A particular quantity  $X$  is an important factor when calculating for electrical circuits.  $X$  can be found using several different equations, as shown.

$$X = \frac{W}{t}$$

$$X = IV$$

$$X = I^2 R$$

$$X = \frac{V^2}{R}$$

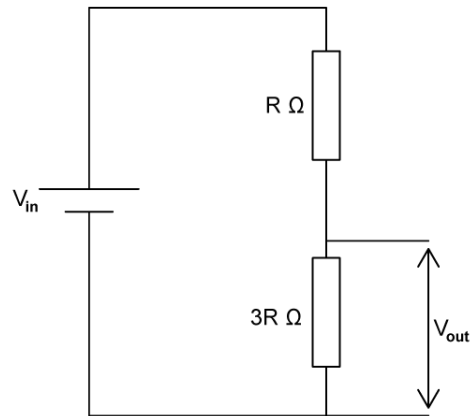
Which option identifies  $X$ ?

- A. Current,  $I$
- B. Power,  $P$
- C. Resistance,  $R$
- D. Resistivity,  $\rho$

[1 mark]

### Question 10

Potential divider circuits are used to control outputs that are often changed, such as volume and brightness. For the potential divider circuit shown, identify the output voltage,  $V_{out}$  in terms of the input voltage,  $V_{in}$ .



- A.  $V_{out} = \frac{1}{4} V_{in}$
- B.  $V_{out} = \frac{1}{3} V_{in}$
- C.  $V_{out} = V_{in}$
- D.  $V_{out} = \frac{3}{4} V_{in}$

[1 mark]