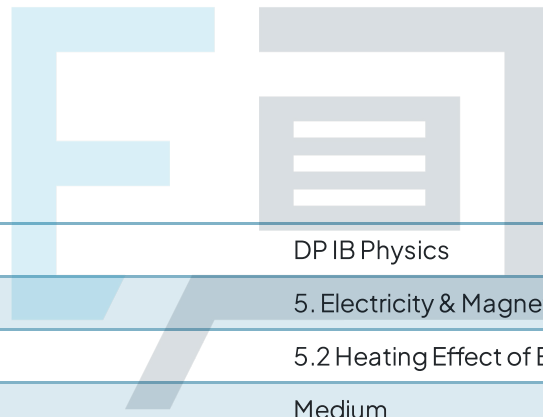




# 5.2 Heating Effect of Electric Currents

## Question Paper



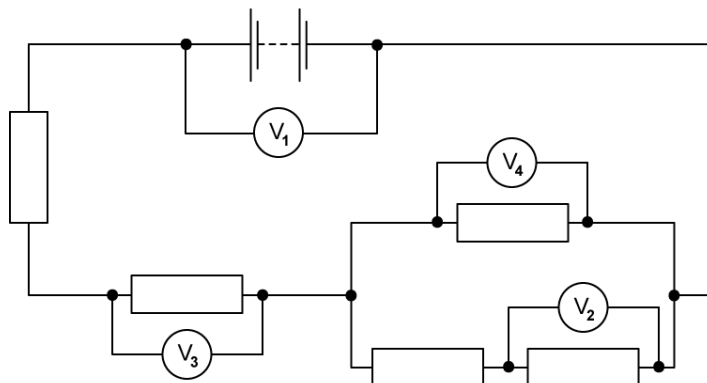
Course	DP IB Physics
Section	5. Electricity & Magnetism
Topic	5.2 Heating Effect of Electric Currents
Difficulty	Medium

# Exam Papers Practice

To be used by all students preparing for DP IB Physics SL  
Students of other boards may also find this useful

### Question 1

A circuit contains five identical resistors and four identical voltmeters. The reading on voltmeter  $V_1$  is 8.0 V and the reading on voltmeter  $V_2$  is 1.0 V. What are the readings on  $V_3$  and  $V_4$ ?



	reading on voltmeter $V_3$ / V	reading on voltmeter $V_4$ / V
A.	1.5	1.0
B.	3.0	2.0
C.	4.5	3.0
D.	6.0	4.0

[1 mark]

### Question 2

A power cable **X** has resistance  $R$  and carries current  $I$ . A second cable **Y** has resistance  $2R$  and carries current  $\frac{1}{2}I$ .

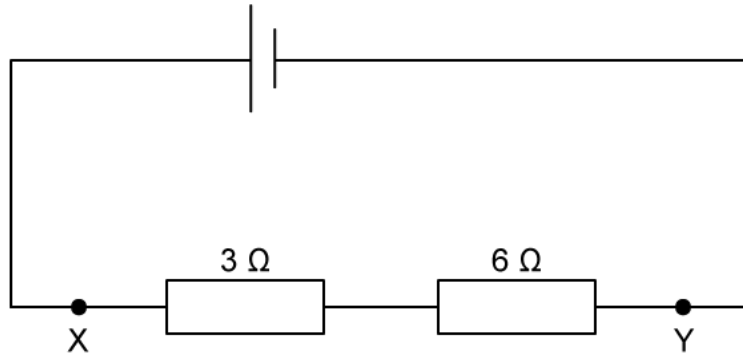
What is the ratio  $\frac{\text{power dissipated in Y}}{\text{power dissipated in X}}$ ?

- A.  $\frac{1}{4}$
- B.  $\frac{1}{2}$
- C. 2
- D. 4

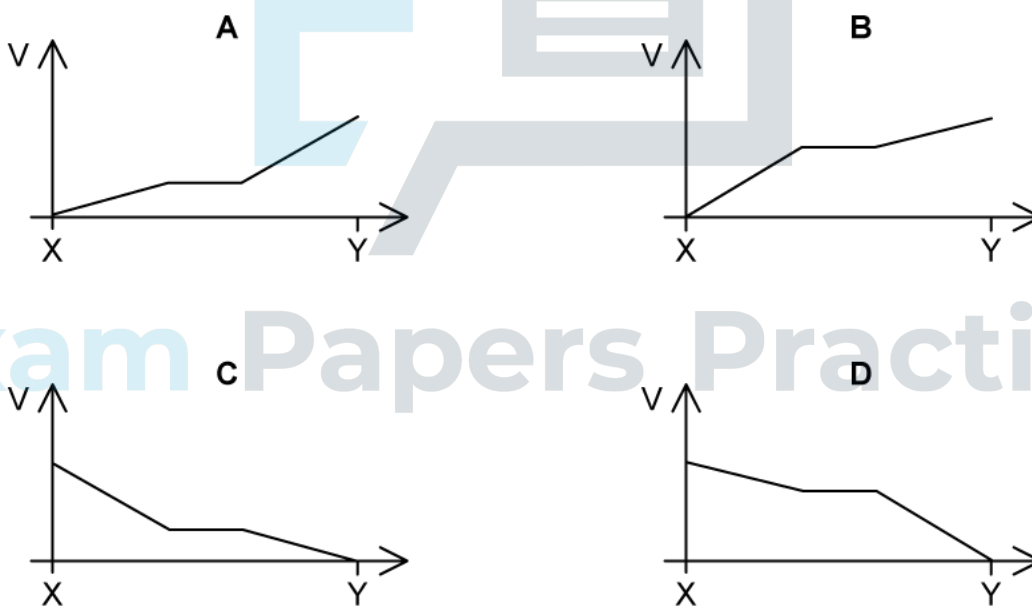
[1 mark]

**Question 3**

Two resistors are connected to a cell.



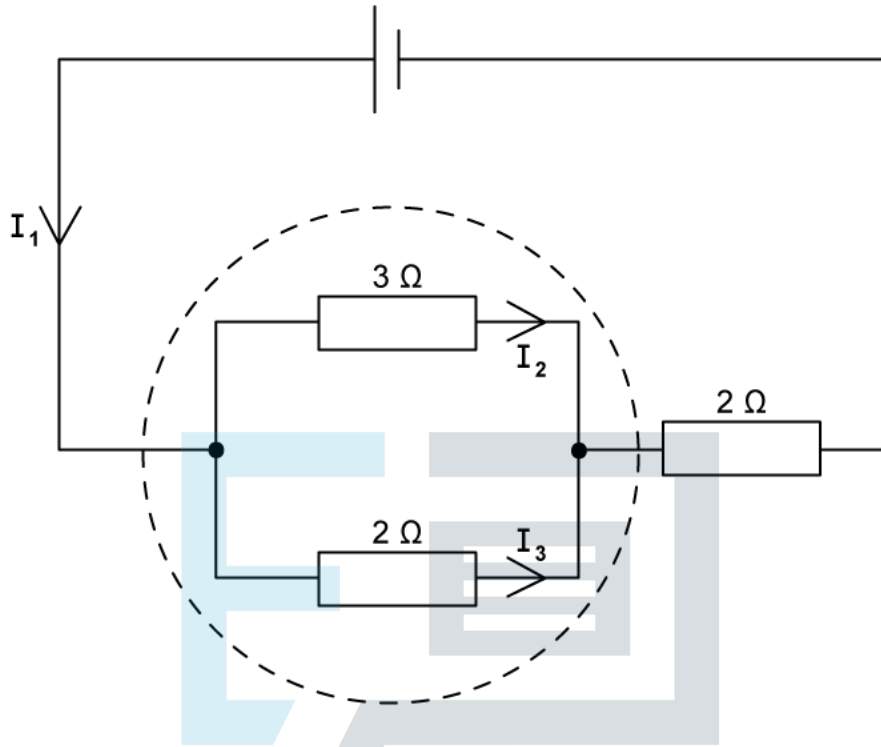
Assuming both resistors are made from wires of the same length, which graph shows how the potential  $V$  varies along the line  $XY$ ?



[1 mark]

**Question 4**

Kirchhoff's laws are applied to the circuit shown.



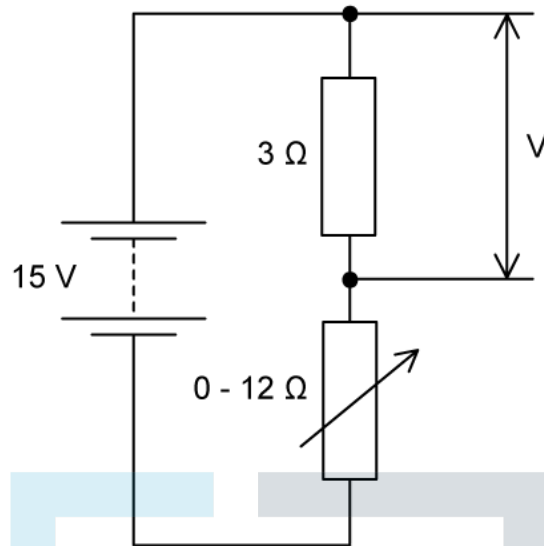
What is the equation for the dotted loop?

- A.  $0 = 2I_3 - 3I_2$
- B.  $0 = 2I_2 - 3I_3$
- C.  $6 = 3I_2 + 2I_3 + 2I_1$
- D.  $6 = 3I_2 + 2I_3$

[1 mark]

### Question 5

In the circuit shown, the fixed resistor has a value of  $3\ \Omega$  and the variable resistor varies between  $0\ \Omega$  and  $12\ \Omega$ .



The power supply has an emf of 15 V and negligible internal resistance.

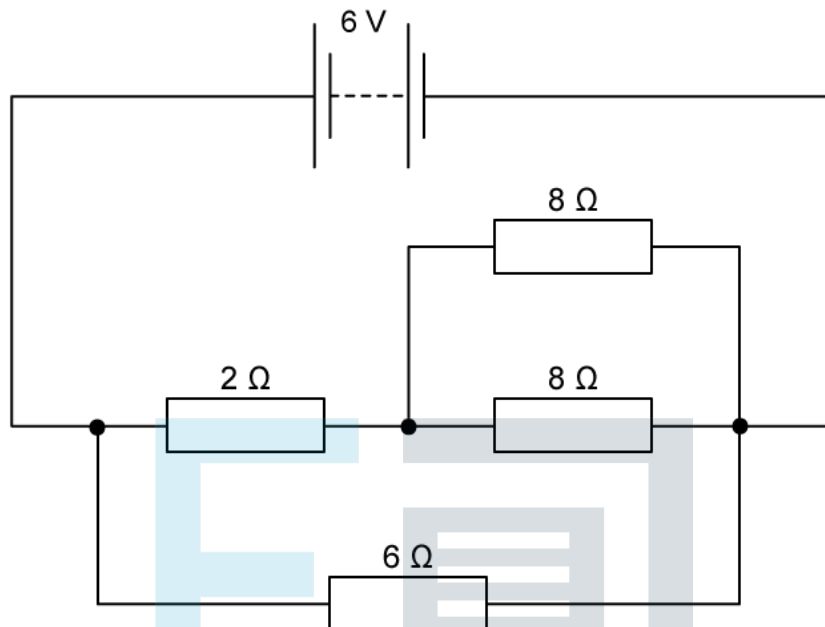
What is the range of potential differences  $V$  which can be measured across the  $3\ \Omega$  resistor?

- A. 3 V
- B. 6 V
- C. 9 V
- D. 12 V

Exam Papers Practice [1 mark]

### Question 6

Four resistors are connected to a battery of e.m.f.  $6\text{ V}$  as shown.



If the battery has negligible internal resistance, what is the current in the battery?

- A.  $2\text{ A}$
- B.  $3\text{ A}$
- C.  $4\text{ A}$
- D.  $5\text{ A}$

[1 mark]

### Question 7

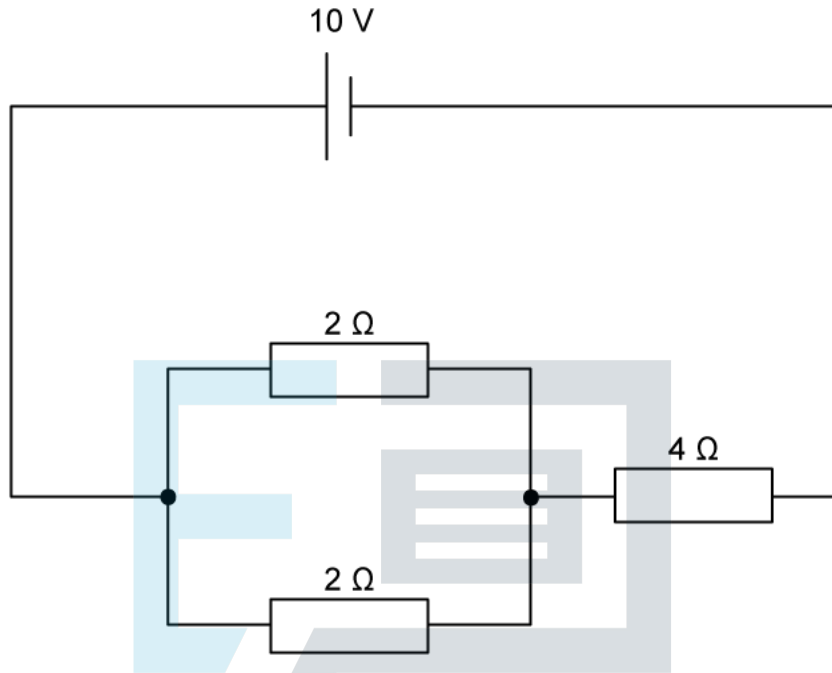
Which of the following cannot be the units for resistivity?

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

[1 mark]

**Question 8**

Three resistors are connected to a cell of e.m.f. 10 V and negligible internal resistance as shown.



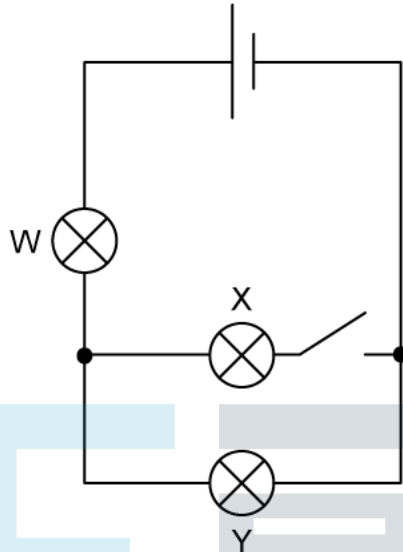
What is the power dissipated in one of the  $2\ \Omega$  resistors and in the whole circuit?

	power dissipated in the $2\ \Omega$ resistor / W	power dissipated in the whole circuit / W
A	1	18
B	1	20
C	2	18
D	2	20

[1 mark]

**Question 9**

Three identical lamps, W, X and Y are connected to a cell of negligible internal resistance as shown.



When the switch is closed, each lamp is lit. Which of the following correctly describes the brightness of lamps W, X and Y when the switch is opened?

	<b>lamp W</b>	<b>lamp X</b>	<b>lamp Y</b>
<b>A</b>	increases	increases	decreases
<b>B</b>	decreases	off	decreases
<b>C</b>	decreases	off	increases
<b>D</b>	increases	decreases	decreases

[1 mark]



### Question 10

A science student who lives in the UK, where the mains voltage is 240 V, buys a light bulb marked 60 W which she uses in her bedroom. The student takes the lightbulb with her on a trip to Canada where the mains voltage is 100 V and also uses it there.

Which line correctly identifies the approximate power dissipated in the bulb in the UK and Canada?

	UK / W	Canada / W
A.	30	10
B.	60	30
C.	60	10
D.	120	60

A.

[1 mark]



# Exam Papers Practice