

# 12.2 DC: Potential Dividers

## Question Paper

|            |                                      |
|------------|--------------------------------------|
| Course     | CIE A Level Physics (9702) 2019-2021 |
| Section    | 12. D.C. circuits                    |
| Topic      | 12.2 DC: Potential Dividers          |
| Difficulty | Easy                                 |

**Time allowed:** 10

**Score:** /10

**Percentage:** /100

### Question 1

A low-voltage supply with an e.m.f. of 20 V and an internal resistance of  $1.5\ \Omega$  is used to supply power to a heater of resistance  $6.5\ \Omega$  in a fish tank.

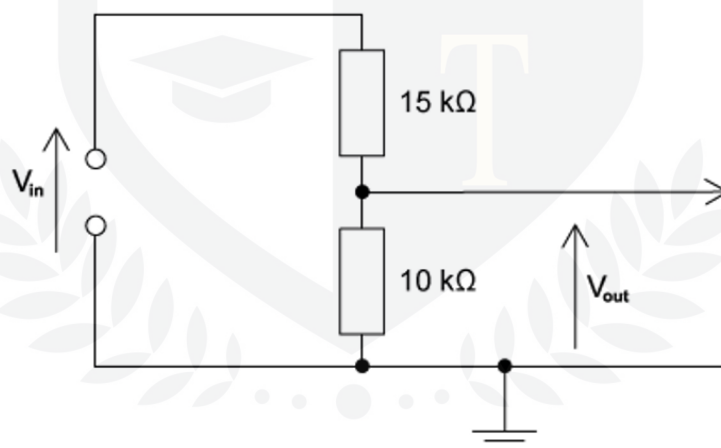
What is the power supplied to the water in the fish tank?

- A** 41 W      **B** 50 W      **C** 53 W      **D** 62 W

[1 mark]

### Question 2

The circuit is designed to trigger an alarm system when the input voltage exceeds some preset value. It does this by comparing  $V_{\text{out}}$  with a fixed reference voltage, which is set at 4.8 V.



$V_{\text{out}}$  is equal to 4.8 V.

What is the input voltage  $V_{\text{in}}$ ?

- A** 4.8 V      **B** 7.2 V      **C** 9.6 V      **D** 12 V

[1 mark]

### Question 3

Which electrical component is represented by the following symbol?

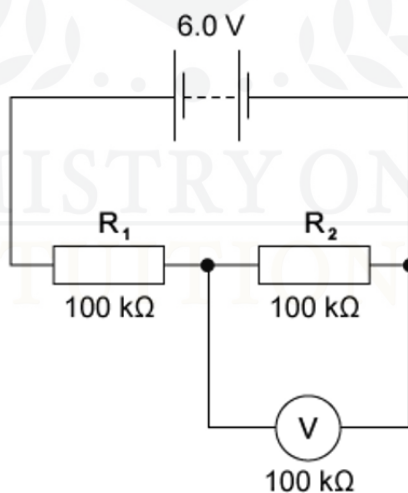


- A a diode
- B a potentiometer
- C a galvanometer
- D a thermistor

[1 mark]

### Question 4

In the circuit shown, the 6.0 V battery has negligible internal resistance. Resistors  $R_1$  and  $R_2$  and the voltmeter have resistance  $100\text{ k}\Omega$ .



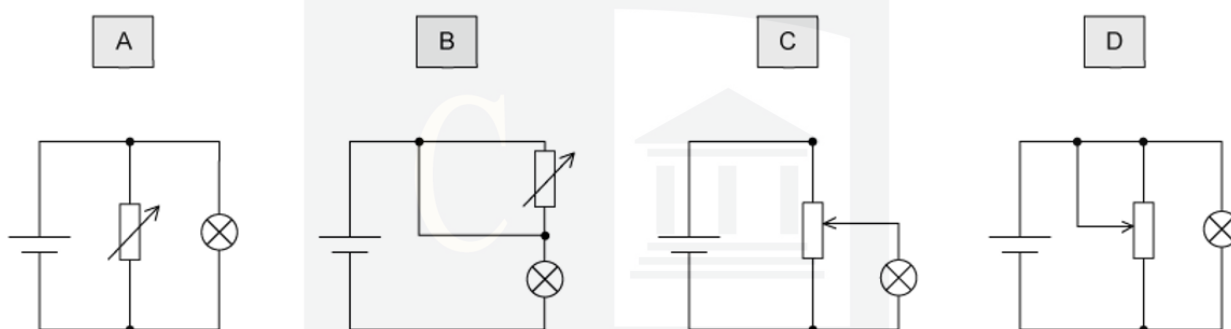
What is the current in the resistor  $R_2$ ?

- A  $20\text{ }\mu\text{A}$
- B  $30\text{ }\mu\text{A}$
- C  $40\text{ }\mu\text{A}$
- D  $60\text{ }\mu\text{A}$

[1 mark]

### Question 5

Which diagram shows a potential divider circuit that can vary the voltage across the lamp?

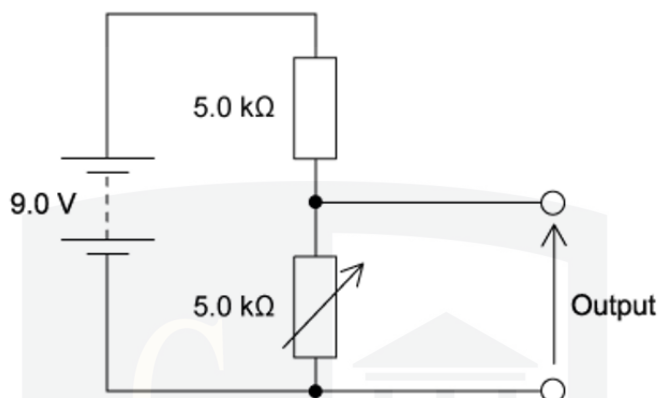


[1 mark]

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### Question 6

The diagram shows a potential divider circuit designed to provide a variable output p.d.



Which gives the available range of output p.d?

|          | maximum output | minimum output |
|----------|----------------|----------------|
| <b>A</b> | 3.0 V          | 0              |
| <b>B</b> | 4.5 V          | 0              |
| <b>C</b> | 9.0 V          | 0              |
| <b>D</b> | 9.0 V          | 4.5 V          |

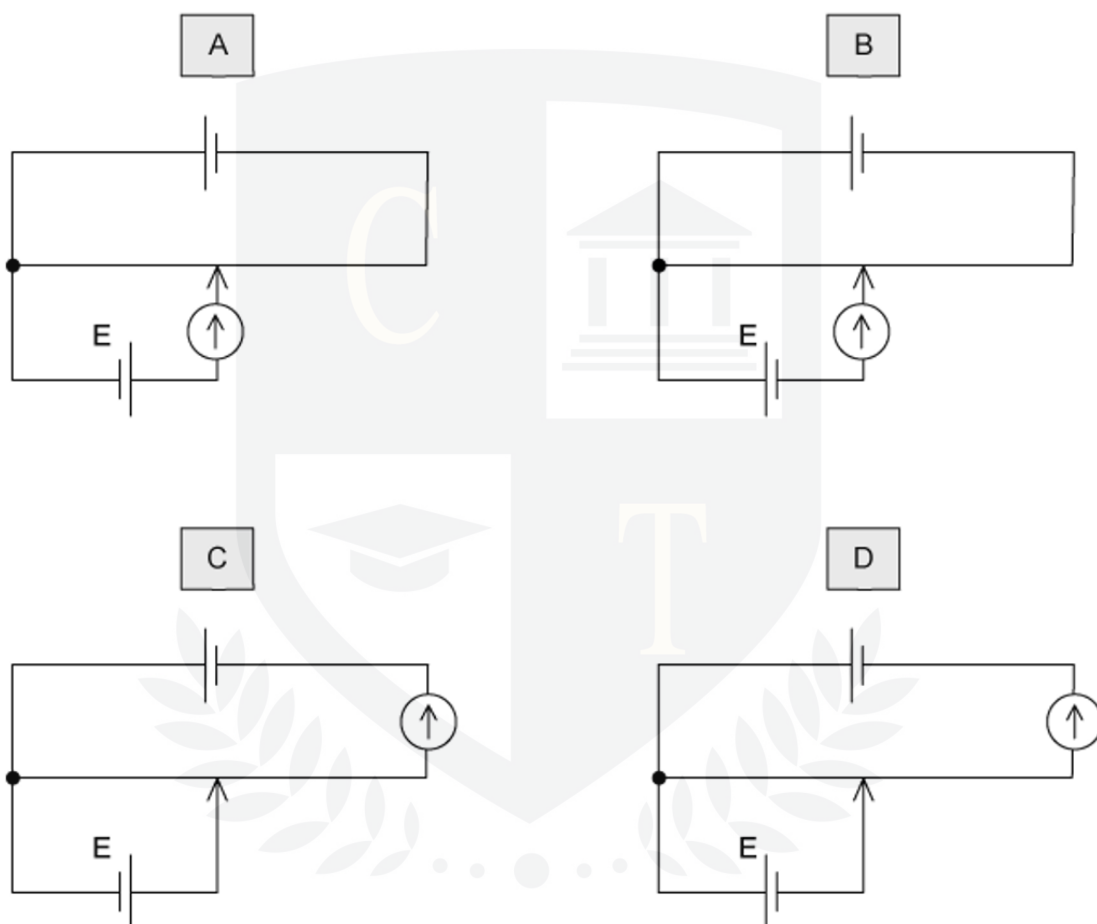
[1 mark]

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### Question 7

The unknown e.m.f.  $E$  of a cell is to be determined using a potentiometer circuit. The balance length is to be measured when the galvanometer records a null reading.

What is the correct circuit to use?



[1 mark]

### Question 8

A source of e.m.f.  $9.0 \text{ mV}$  has an internal resistance of  $6.0 \Omega$ . It is connected across a galvanometer of resistance  $30 \Omega$ .

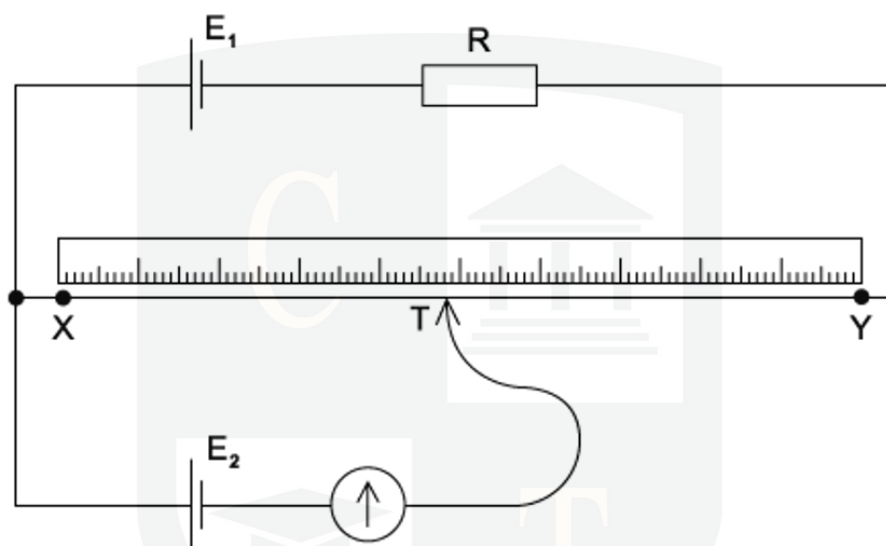
What is the current in the galvanometer?

- A**  $250 \mu\text{A}$       **B**  $300 \mu\text{A}$       **C**  $1.5 \text{ mA}$       **D**  $2.5 \text{ mA}$

[1 mark]

### Question 9

The diagram shows a potentiometer circuit.



The contact T is placed on the wire and moved along the wire until the galvanometer reading is zero. The length XT is then noted.

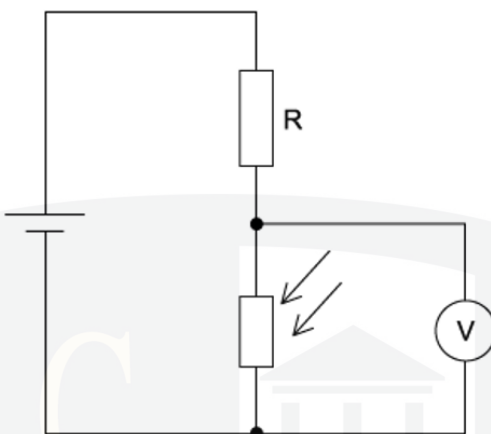
In order to calculate the potential difference per unit length of the wire XY, which value must also be known?

- A the e.m.f. of the cell  $E_1$
- B the e.m.f. of the cell  $E_2$
- C the resistance of resistor R
- D the resistance of the wire XY

[1 mark]

### Question 10

A potential divider consists of a fixed resistor  $R$  and a light-dependent resistor (LDR)



What happens to the voltmeter reading, and why does it happen, when the intensity of light on the LDR increases?

- A** the voltmeter reading decreases because the LDR resistance decreases
- B** the voltmeter reading decreases because the LDR resistance increases
- C** the voltmeter reading increases because the LDR resistance decreases
- D** the voltmeter reading increases because the LDR resistance increases

[1 mark]

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