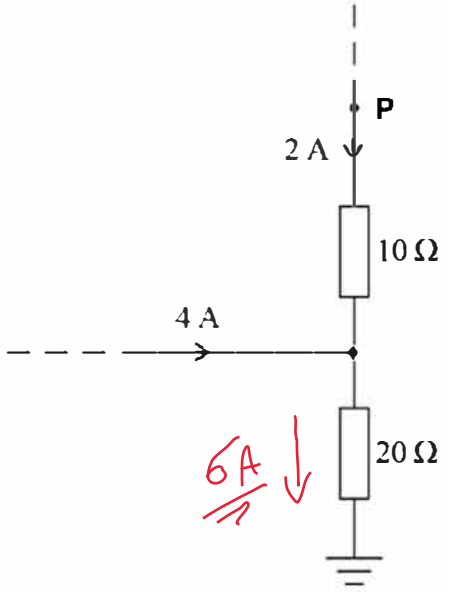
Do not write outside the box

2 3 The diagram shows part of a circuit and the currents in the circuit.



What is the potential difference between point **P** and earth?

[1 mark]

A 60 V ○

B 100 V ○

C 120 V ○

D 140 V ○

2 4 A voltmeter has a resistance of 4.0 kΩ and reads 1.0 V for every scale division on the meter.

A power supply of emf 20 V and negligible internal resistance is connected across this voltmeter and a resistor in series. The voltmeter reads two divisions.

What is the value of the resistor?

[1 mark]

A 44 kΩ ○

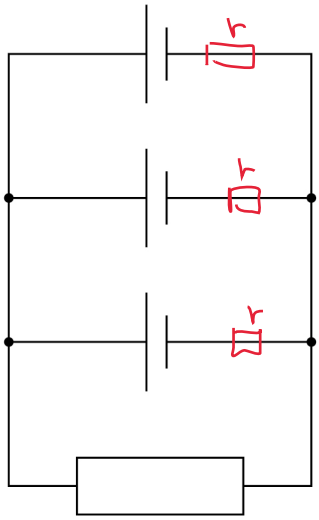
B 36 kΩ ○

C 4.4 kΩ ○

D 3.6 kΩ ○

Do not write outside the box

2 8 A resistor of resistance R and three identical cells of emf E and internal resistance r are connected as shown.



Total $r = \frac{r}{3}$

So

What is the current in the resistor?

$I = \frac{V}{R} = \frac{E}{\frac{r}{3} + R}$

[1 mark]

A $\frac{3E}{(3R + r)}$

B $\frac{9E}{(3R + r)}$

C $\frac{E}{R}$

D $\frac{3E}{R}$

Algebra.

$\frac{E}{r/3 + R} = \frac{3E}{r + 3R}$

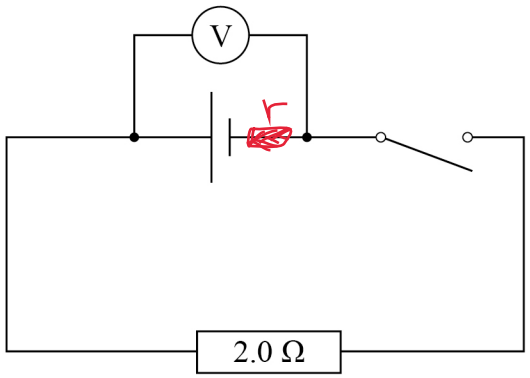
(Don't believe me – make up values for E, r & R & check)

Turn over for the next question

Do not write outside the box

2 9 In the circuit, the reading of the voltmeter is V.

When the switch is closed the reading becomes $\frac{V}{3}$.



- So 2V dropped over r → is twice that over 2.0Ω so must be 4Ω.

What is the internal resistance of the cell?

[1 mark]

A 0.33 Ω ⬭

B 0.67 Ω ⬭

C 4.0 Ω ⬭

D 6.0 Ω ⬭

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END OF QUESTIONS