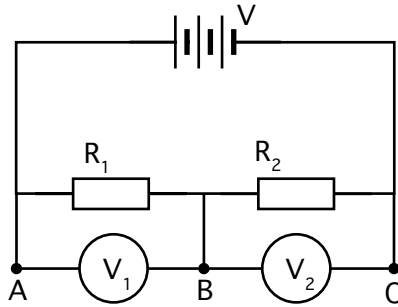


Potential dividers

Name & Set



- 1 In the circuit shown below the p.d. of the battery is 12 V. Assume that the battery has no internal resistance



If R_1 is 50Ω and R_2 is 250Ω

- (i) what would voltmeter V_1 read?

[3]

- (ii) what would voltmeter V_2 read?

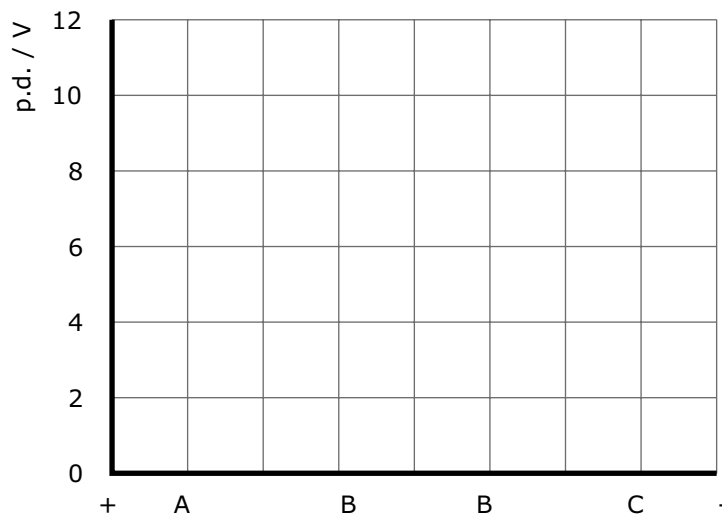
[1]

- (iii) what is the voltage at A? _____ [1]

- (iv) what is the voltage at B? _____ [1]

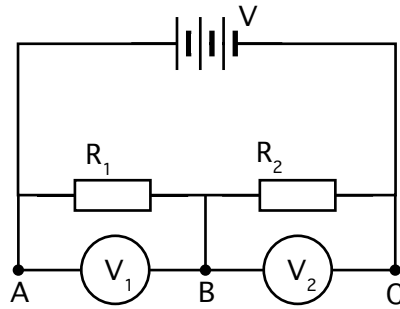
- (v) What is the voltage at C? _____ [1]

- (vi) Plot a graph of the p.d. across each part of the circuit from the positive terminal of the cell (+) to the negative terminal of the cell (-). BB on the graphs represents the wire between R_1 & R_2 is. [3]



AS Electricity

- 2 In the circuit shown below the p.d. of the battery is 36 V. Assume that the battery has no internal resistance



If R_1 is $10\text{K}\Omega$ and R_2 is $80\text{K}\Omega$

- (i) What would voltmeter V_1 read?

[3]

- (ii) What would voltmeter V_2 read? _____ [1]

- (iii) what is the voltage at A? _____ [1]

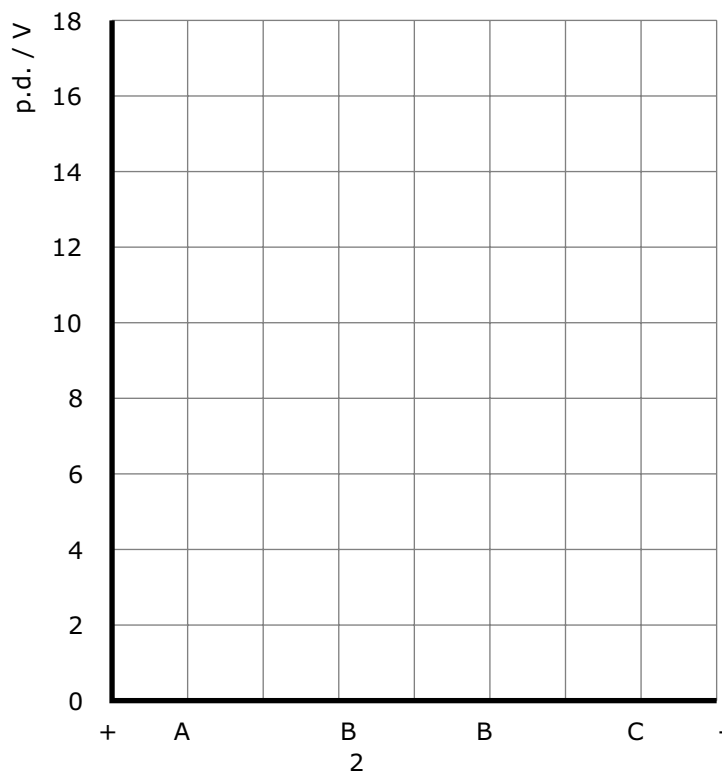
- (iv) what is the voltage at B? _____ [1]

- (v) What is the voltage at C? _____ [1]

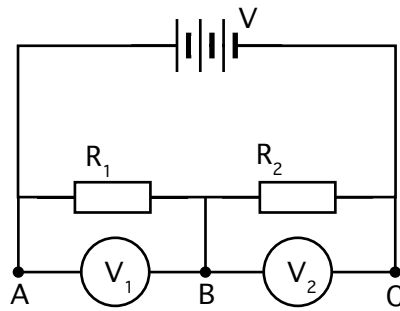
- (vi) What current is drawn from the battery?

[3]

(vii) Plot a graph of the pd around the circuit. [3]



- 3 In the circuit shown below the p.d. of the battery is 6 V. Assume that the battery has no internal resistance



If R_1 is $250\text{K}\Omega$ and R_2 is $500\text{K}\Omega$,

- (i) What would voltmeter V_1 read?

[3]

- (ii) What would voltmeter V_2 read?

[3]

- (iii) What is the voltage at A? _____ [1]

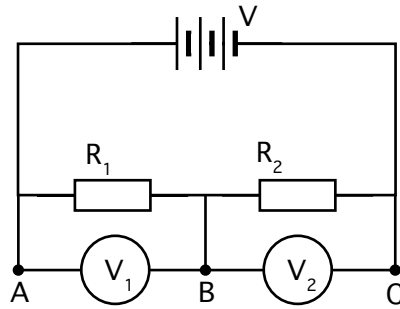
- (iv) What is the voltage at B? _____ [1]

- (v) What is the voltage at C? _____ [1]

- (vi) What current is drawn from the battery?

[3]

- 4 In the circuit shown below the p.d. of the battery is 18 V. Assume that the battery has no internal resistance



If R_1 is $600\text{K}\Omega$ and R_2 is $300\text{K}\Omega$

- (i) What would voltmeter V_1 read?

[3]

- (ii) What would voltmeter V_2 read?

[3]

- (iii) What is the voltage at A? _____ [1]

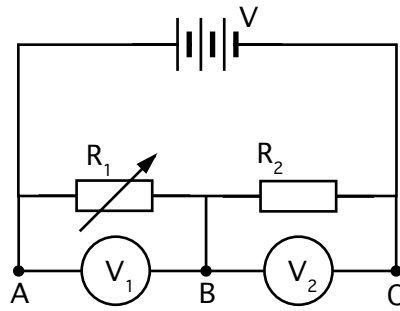
- (iv) What is the voltage at B? _____ [1]

- (v) What is the voltage at C? _____ [1]

- (vi) What current is drawn from the battery?

[3]

- 5 In the circuit shown below the p.d. of the battery is 15 V. Assume that the battery has no internal resistance



R_1 is a variable resistor that varies from 0Ω to 500Ω and R_2 is 100Ω

- (i) What would voltmeter V_1 read when R_1 is set to its lowest resistance?

_____ [1]

- (ii) What would voltmeter V_2 read when R_1 is set to its lowest resistance??

 _____ [3]

- (iii) What would voltmeter V_1 read when R_1 is set to its highest resistance?

 _____ [3]

- (iv) What would voltmeter V_2 read when R_1 is set to its highest resistance?

 _____ [3]

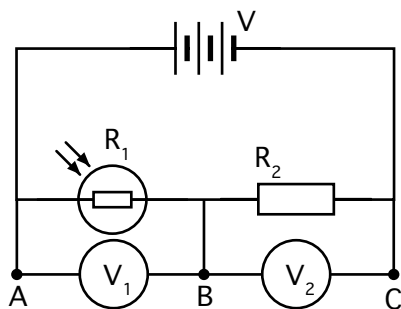
- (v) What should the resistance of R_1 be if voltmeter V_1 read 6V?

 _____ [3]

- (iv) What should the resistance of R_1 be if voltmeter V_2 read 10V?

 _____ [3]

- 5 In the circuit shown below the p.d. of the battery is 10 V. Assume that the battery has no internal resistance



R_1 is an LDR that varies from 0Ω in full light to 1000Ω in the dark and R_2 is a fixed resistor of 100Ω

- (i) What would voltmeter V_1 read when the LDR is covered over so no light reaches it?

[3]

- (ii) What would voltmeter V_2 read when the LDR is covered over so no light reaches it?

[1]

- (iii) What would voltmeter V_1 read when the LDR is fully illuminated?

[1]

- (iv) What would voltmeter V_2 read when LDR is fully illuminated?

[1]

- (ii) What should the resistance of R_1 be if voltmeter V_1 read 2.5V?

[3]

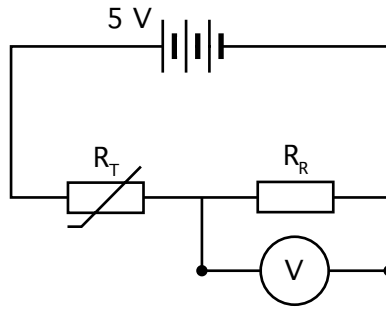
- (ii) What should the resistance of R_1 be if voltmeter V_2 read 2.5V?

[3]

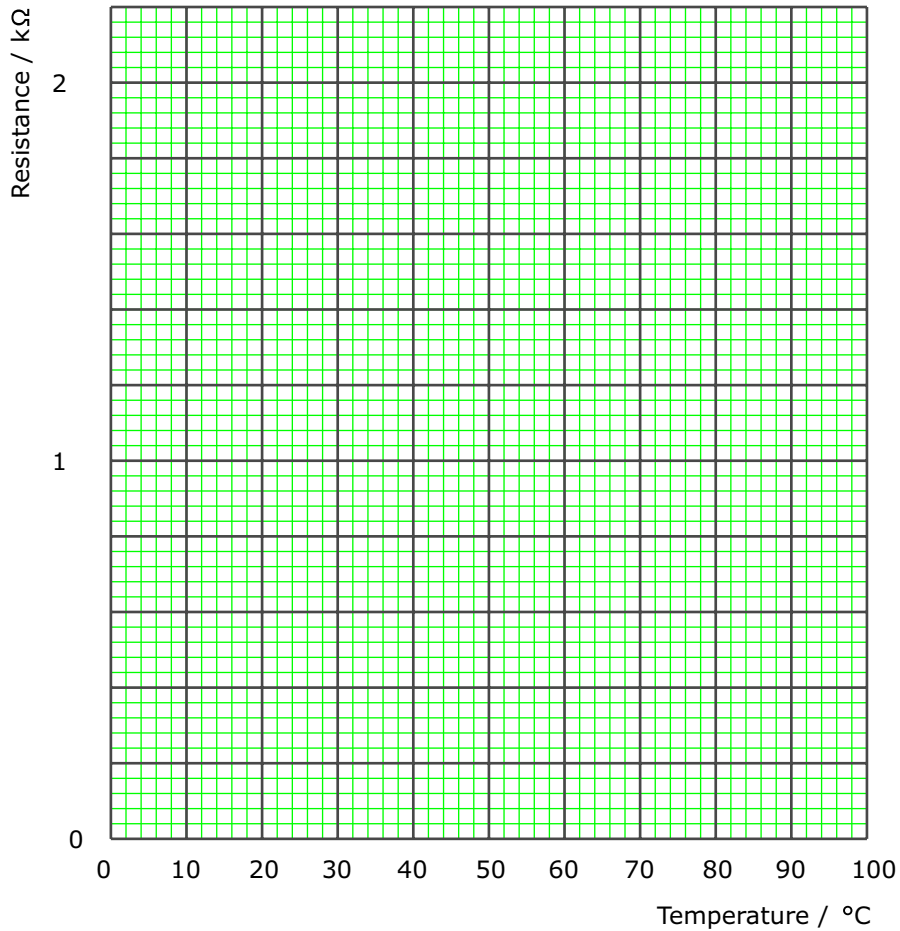
- 6 The circuit diagram below shows a type of electric thermometer. A thermistor, R_T , is used as a temperature probe. A high resistance voltmeter is used to indicate the temperature. Your task is to draw up a calibration curve for the voltmeter so that it can be read directly as a thermometer.

Data for the resistance of the thermistor, R_T , as a function of its temperature is given in the table. The value of the fixed resistor R_R is $1\text{k}\Omega$.

Temp (°C)	R_T (k Ω)
10	2.1
20	1.4
30	1.0
40	0.7
50	0.5
60	0.3



- (a) Plot a graph of temperature against resistance for the thermistor over the range $0\text{ }^\circ\text{C}$ to $100\text{ }^\circ\text{C}$. (Use **Graphical Analysis** or **Excel** if you wish and submit the print out.) [3]



- (b) Use the graph and a calculation to determine what the voltmeter will read when the thermistor is at 30°C.

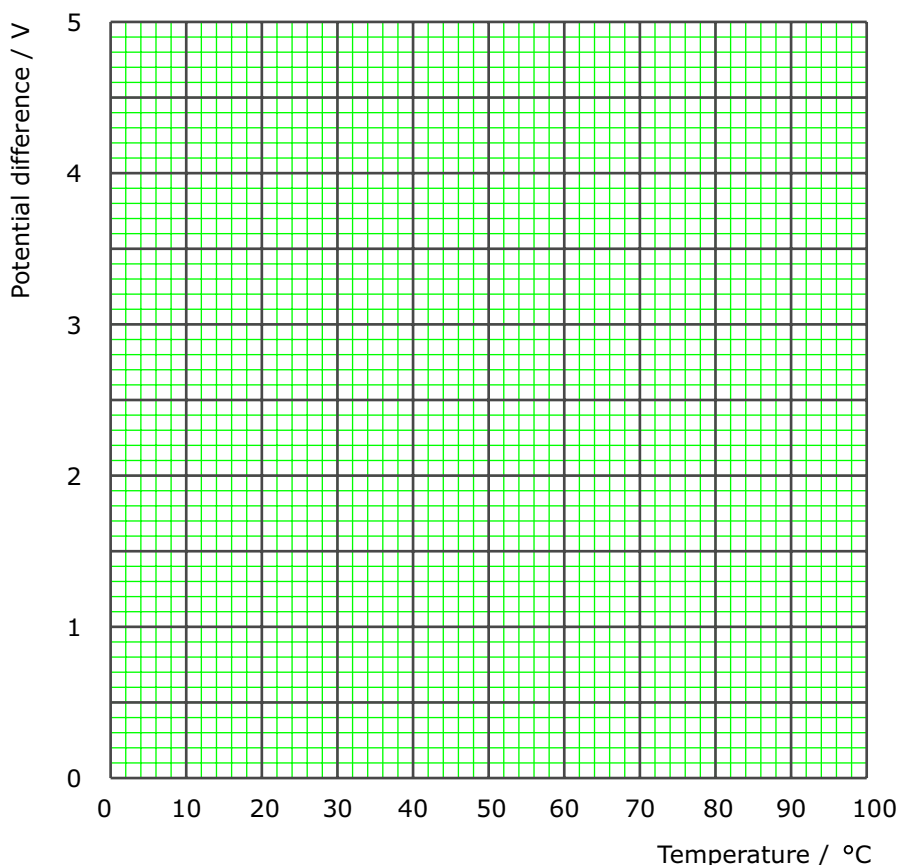
_____ [2]

- (c) Draw up a table of the p.d. across the resistance R_R corresponding to different thermistor temperatures. (Use **Graphical Analysis** or **Excel** if you wish and submit the print out.)

 _____ [4]

Temperature / °C	0	10	20	30	40	50	60	70	80	90	100
p.d. / Volts											

- (d) Draw a graph of voltmeter reading (on y axis) against temperature of thermistor (on the x axis).



- (e) What does the voltmeter read at
 0 °C _____ 70 °C _____ 100 °C? _____ [3]

- (f) Between what temperatures is the thermometer scale linear? _____ [1]