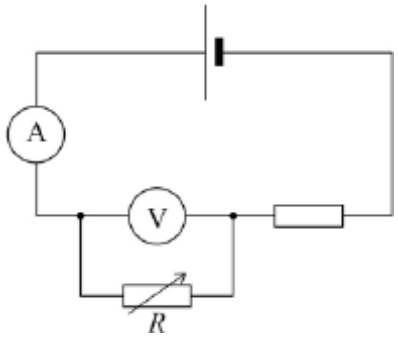
Q1.

In the circuit shown in the diagram the cell has negligible internal resistance.



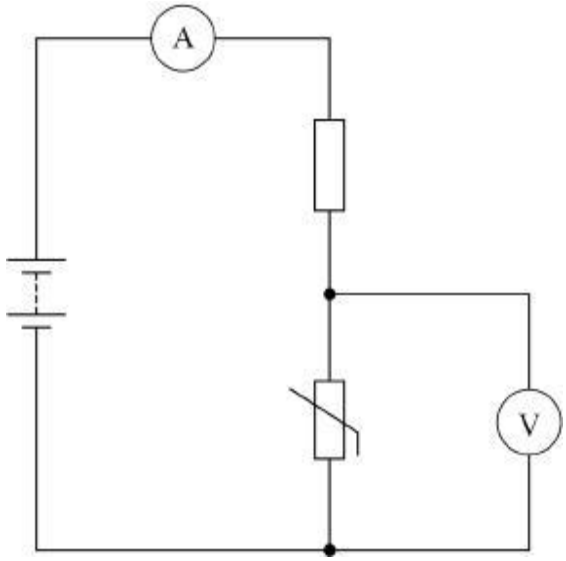
What happens to the reading of both meters when the resistance of R is decreased?

	Reading of ammeter	Reading of voltmeter	
A	increases	increases	⬭
B	increases	decreases	⬭
C	decreases	increases	⬭
D	unchanged	decreases	⬭

(Total 1 mark)

Q2.

The diagram shows a temperature-sensing circuit.



The temperature of the thermistor is decreased.

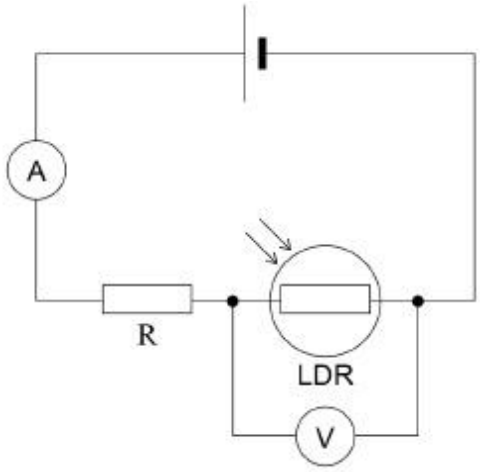
Which row shows the changes to the ammeter reading and the voltmeter reading?

	Ammeter reading	Voltmeter reading	
A	increases	increases	⬭
B	increases	decreases	⬭
C	decreases	decreases	⬭
D	decreases	increases	⬭

(Total 1 mark)

Q3.

The figure shows a light dependent resistor (LDR) and fixed resistor R connected in series across a cell. The internal resistance of the cell is negligible.



Which row shows how the readings on the ammeter and the voltmeter change when the light intensity incident on the LDR is increased?

	Ammeter reading	**Voltmeter reading**	
A	decreases	increases	⬭
B	decreases	decreases	⬭
C	increases	increases	⬭
D	increases	decreases	⬭

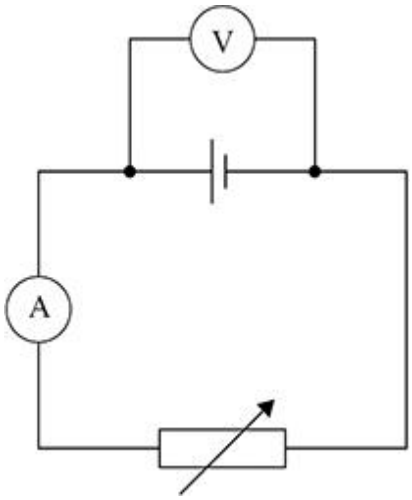
(Total 1 mark)

Note

Q4. and Q5. require you to draw a resistor representing the internal resistance and a good understanding of how voltmeters work. The question then becomes a potential divider question.

Q4.

In the circuit shown, the cell has an emf of 12 V and an internal resistance which is not negligible.



When the resistance of the variable resistor is 10 Ω the voltmeter reads 10 V and the ammeter reads 1.0 A.

The resistance of the variable resistor is changed to 5 Ω.

What is the new reading on the ammeter?

A 1.4 A ⬭

B 1.7 A ⬭

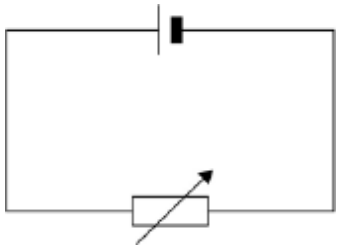
C 2.0 A ⬭

D 2.4 A ⬭

(Total 1 mark)

Q5.

The cell in the circuit has an emf of 2.0 V. When the variable resistor has a resistance of 4.0 Ω, the potential difference (pd) across the terminals of the cell is 1.0 V.



What is the pd across the terminals of the cell when the resistance of the variable resistor is 12 Ω?

A 0.25 V ⬭

B 0.75 V ⬭

C 1.33 V ⬭

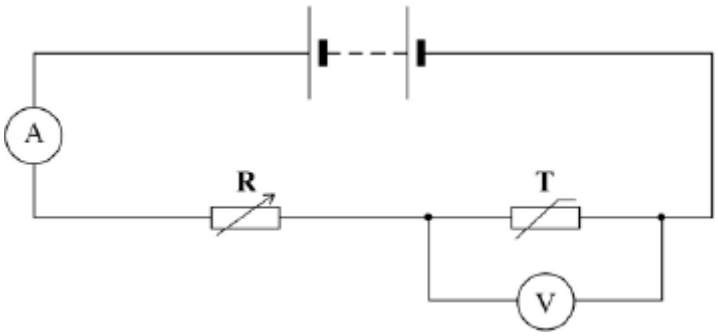
D 1.50 V ⬭

(Total 1 mark)

Q6.

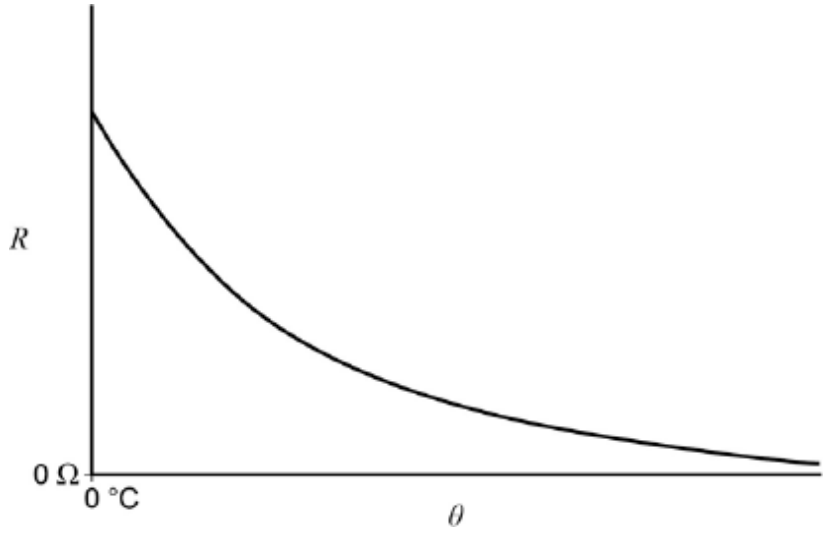
Figure 1 shows a circuit including a thermistor **T** in series with a variable resistor **R**. The battery has negligible internal resistance.

Figure 1



The resistance–temperature ($R-\theta$) characteristic for **T** is shown in **Figure 2**.

Figure 2



(a) The resistor and thermistor in **Figure 1** make up a potential divider.

Explain what is meant by a potential divider.

_____

_____

_____

(1)

(b) State and explain what happens to the voltmeter reading when the resistance of **R** is increased while the temperature is kept constant.

(3)

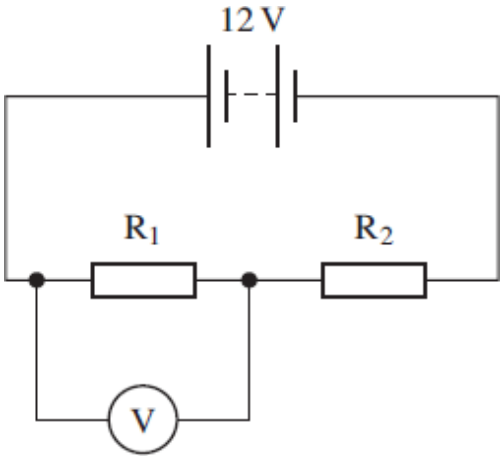
(c) State and explain what happens to the ammeter reading when the temperature of the thermistor increases.

(2)

(Total 6 marks)

Q7.

The figure below shows two resistors, R_1 and R_2, connected in series with a battery of emf 12 V and negligible internal resistance.



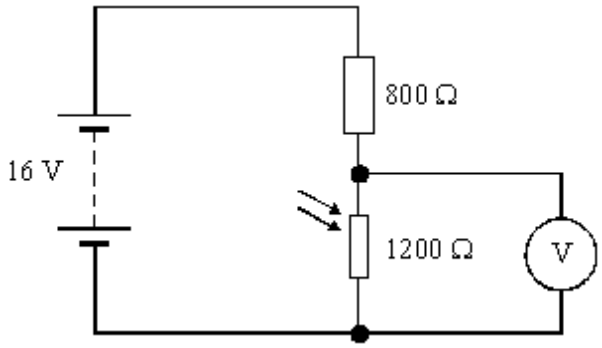
In the circuit shown in the figure above R_2 is replaced with a thermistor. State and explain what will happen to the reading on the voltmeter as the temperature of the thermistor increases.

(3)

(Total 3 marks)

Q8.

The diagram below shows a potential divider consisting of a resistor in series with a light dependent resistor. The voltmeter connected in parallel with the light dependent resistor has an infinite resistance. The battery has an emf of 16V with a negligible internal resistance.



The light intensity in the room is increased. State and explain what happens to the resistance of the LDR and the reading on the voltmeter.

_____

_____

_____

_____

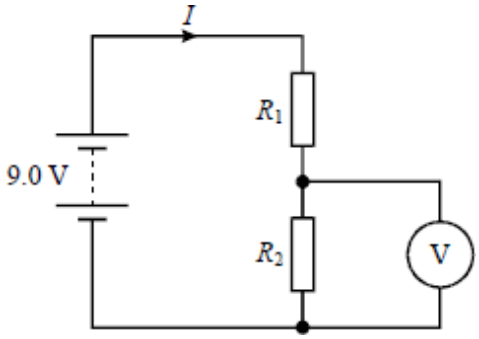
_____

(3)

(Total 3 marks)

Q9.

In the circuit shown, the battery has negligible internal resistance.



The circuit shown in the diagram acts as a potential divider. The circuit is now modified by replacing R_1 with a temperature sensor, whose resistance decreases as the temperature increases.

Explain whether the reading on the voltmeter increases or decreases as the temperature increases from a low value.

_____

_____

_____

_____

_____

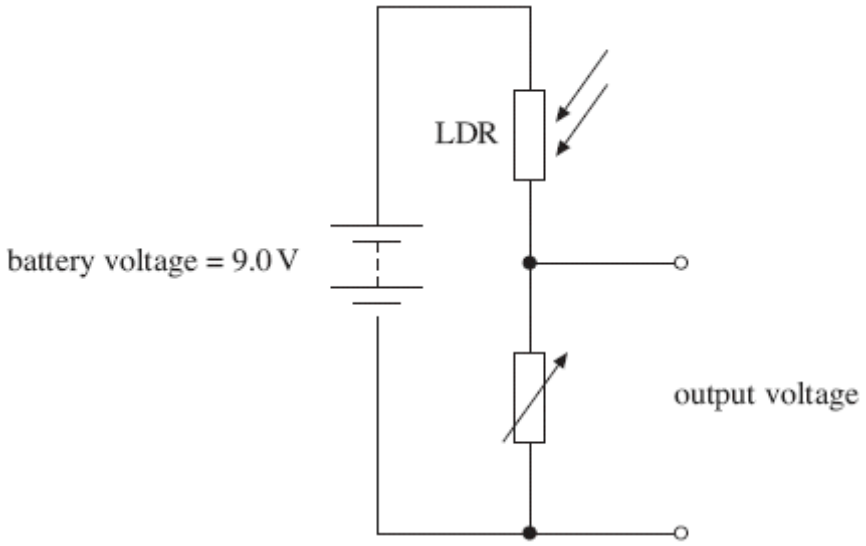
(3)

(Total 3 marks)

Q10.

An LDR is used in the circuit in **Figure 2** to monitor light levels.

Figure 2



State and explain the effect on the output voltage of an increase in light level at the LDR.

_____

_____

_____

_____

(2)

(Total 2 marks)