

- 1 (a) (i) Define potential difference (p.d.).

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.....

[1]

- (ii) Define electromotive force (e.m.f.).

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.....

[1]

- (b) On Fig. 1.1, sketch the resistance-temperature characteristic of a negative temperature coefficient (NTC) thermistor.

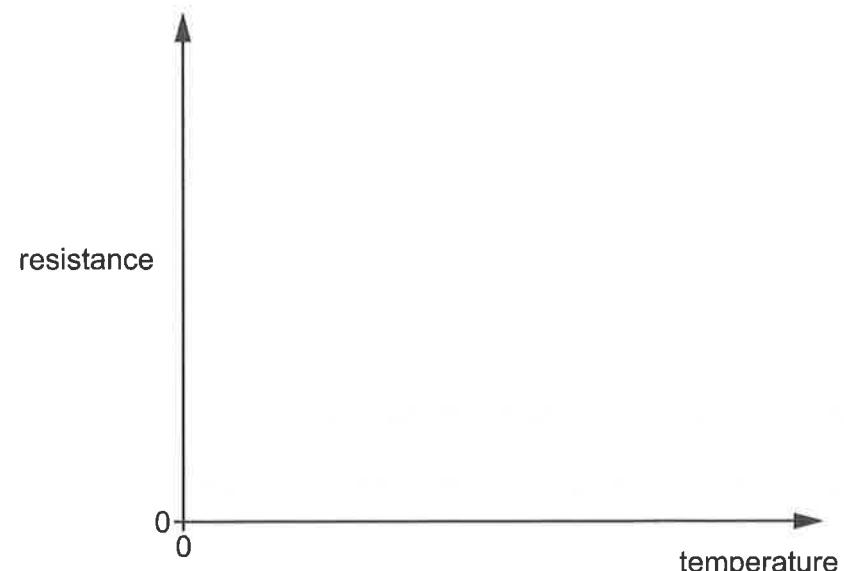


Fig. 1.1

[2]





- (c) An NTC thermistor is connected in series with a  $400\Omega$  fixed resistor and a  $1.5V$  cell which has negligible internal resistance.

- (i) Draw a circuit diagram for this arrangement.

Include an ammeter to measure the current in the thermistor and a voltmeter to measure the p.d. across the thermistor.

[2]

- (ii) At  $25^\circ\text{C}$  the resistance of the thermistor is  $30\Omega$ .

Calculate the potential difference across the fixed resistor.

potential difference = ..... V [2]





- (d) (i) Calculate the thermal power produced in the thermistor.

power = ..... W [2]

- (ii) The fixed resistor is replaced with a different fixed resistor of resistance  $1.2\Omega$ .

Explain the changes that happen in the circuit.

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[4]

[Total: 14]

