

**Time Allowed: 45 minutes**

- Answers are to be written in the spaces provided.
- The answer should take up no more than the space provided. Excessively long answers will have marks deducted if the information is not concise.
- If you make a mistake cross it out and add the appropriate number or lines of writing to the spare paper attached.
- Please use the space allocated at the bottom of each question for references. This will count for 3 marks towards the total mark of the task.

1. Superconductors have a many potential applications in technology. However there is one main factor which limits there ability to be used more widely. Outline this factor.. (2marks)

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References.....

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2. Identify two factors which inhibit the ability of metals to conduct an electric current. (1 mark)

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References .....

3. One possible application of superconductivity is in their use in electrical transmission wires.

(a) Outline the ( 1 mark)

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References .....

(b) Explain how the shortcoming mentioned in part (a), has lead to an increased knowledge of the properties of materials that are used to make transistors. (3marks)

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References .....

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4. (a) The BCS theory describes the ability of materials to become superconductors if conducting electrons are able to pair up. Using a diagram explain the mechanism that allows electrons to pair up. ( 4 marks )

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References .....

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(b) Solid state devices have replaced thermionic devices for most applications Discuss this statement. (3 marks)

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5. Assess the impact of the invention of transistors on society. In your answer equal attention should be paid to negative and positive impacts. ( 6 marks)

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