

Design & Technology

AQA A-Level

Paper 1 – Technical Principles

2 hours 30 minutes

Materials required for questions

- Pencil
- Rubber
- Calculator

Instructions

- Use black ink or ball-point pen
- Try answer all questions
- Use the space provided to answer questions
- Calculators can be used if necessary
- For the multiple choice questions, circle your answer

Advice

- Marks for each question are in brackets
- Read each question fully
- Try to answer every question
- Don't spend too much time on one question

Good luck!

120 marks

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Q1.1) Explain the meaning of the following terms. **(4 marks)**

Thermal conductivity:

Electrical conductivity:

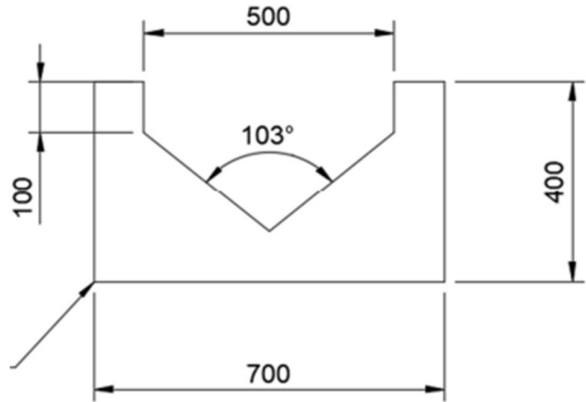
Q1.2) A wall is made from a material with a thermal conductivity of 0.5 W/mK. An improved material has a thermal conductivity of 0.2 W/mK. The heat loss through the wall is directly proportional to the thermal conductivity.

Calculate the percentage reduction in heat loss when the improved material is used. **(4 marks)**

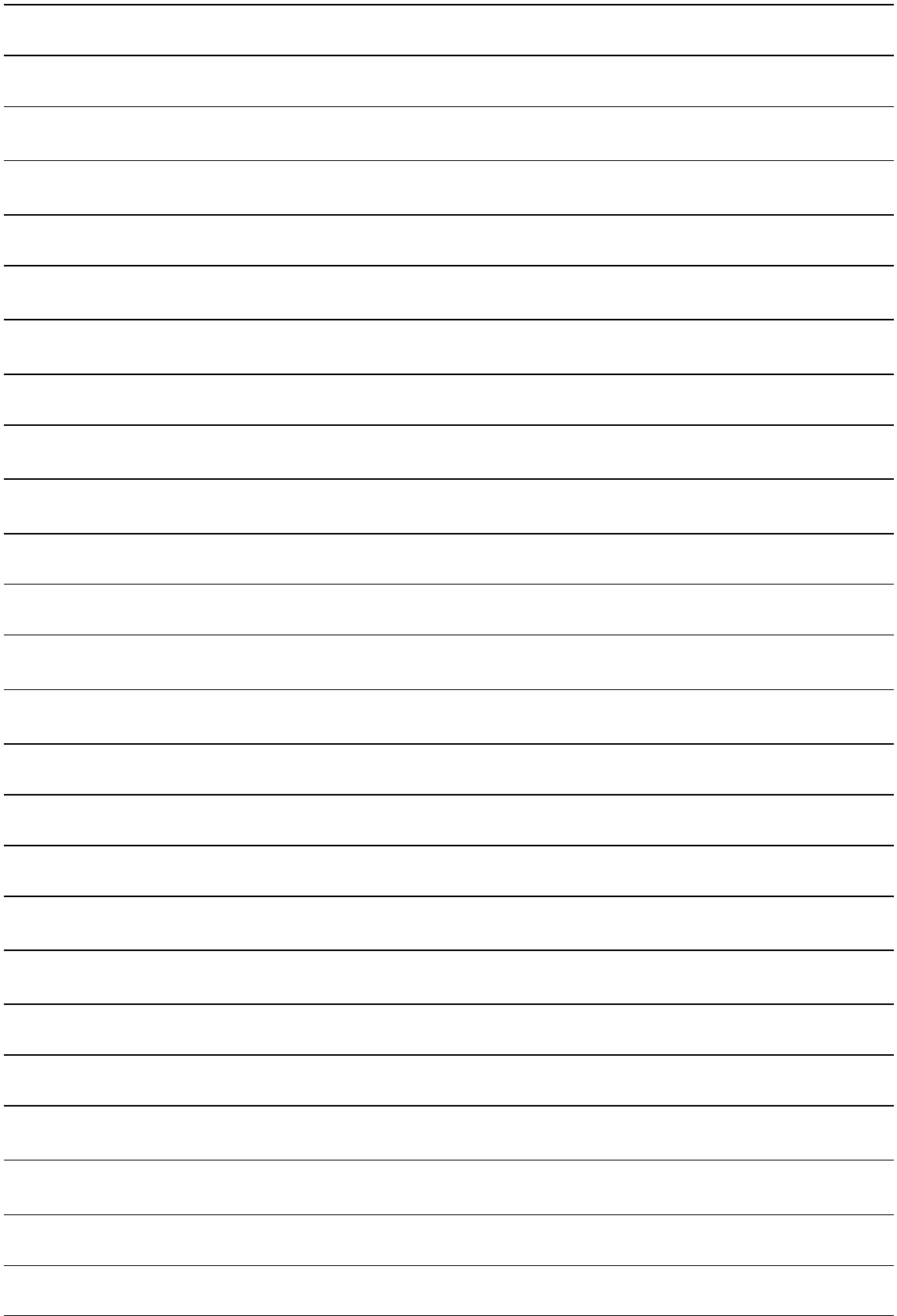
Q7.2) A CFD simulation takes 12 hours to run on a computer with a processing speed of 2.5 GHz. A new computer has a processing speed of 4.0 GHz. Assuming simulation time is inversely proportional to processing speed, calculate the new simulation time. **(4 marks)**

Q8.1) One safe working practice when operating a bandsaw would be to wear personal protective equipment (PPE). Give two other safe working practices when operating a bandsaw. **(2 marks)**

Q13) The image below shows the cross-section of a steel bracket. All dimensions are in mm.



The length of the bracket will 6m and 20 will be made. If the steel has a density of $7,750\text{kg/m}^3$, what will the overall mass of the stell be. **(6 marks)**



Q18) Give three benefits of using stock forms of material for a manufacturer. **(3 marks)**

END OF QUESTIONS