

Design & Technology
Edexcel A-Level

Paper – 9DT0/01

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

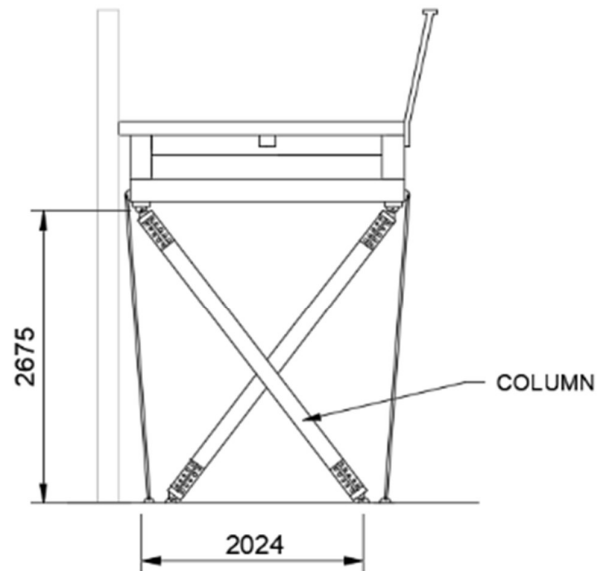
Q1) The image shows a large table. The tabletop is made from veneered chipboard.



Q1a) Name **two** alternative manufactured boards which could be used instead of chipboard for the tabletop **(2 marks)**

Q1b) Explain **three** reasons why a veneered chipboard top is more suited to this design than a solid timber top. **(6 marks)**

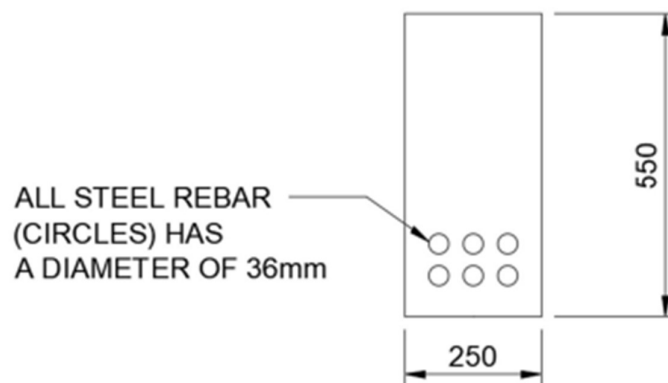
Q2) The image shows a design for a footbridge.



Q2a) The timber decking will use preservatives as a finish. Explain **two** reasons for this finish. **(4 marks)**

Q2b) Calculate the length of the column. All measurements are in mm **(3 marks)**

Q2c) Two reinforced concrete beams are designed to support the footbridge. The beams are 6m long and a of the beams is show below. What is the volume of concrete needed for both the beams. All measurements are in mm. **(4 marks)**



Q3) The image below shows an engine part made form stainless steel.



Q3a) Explain **one** reason stainless steel is suitable for the engine part **(2 marks)**

Q3b) Describe, using annotated sketches, the process of investment casting the engine part. **(6 marks)**

Q3c) Explain **two** advantages of using investment casting rather than sand casting for making the engine part **(6 marks)**

Q3d) The engine part has four quality control checks. The probability of failure for each check is shown below

- Fail in check A: 0.02
- Fail in check B: 0.043
- Fail in check C: 0.005
- Fail in check D: 0.012

A part will fail the quality control check if A, B and C fail together or if D fails. If 20,000 parts are made, estimate how many will fail **(4 marks)**

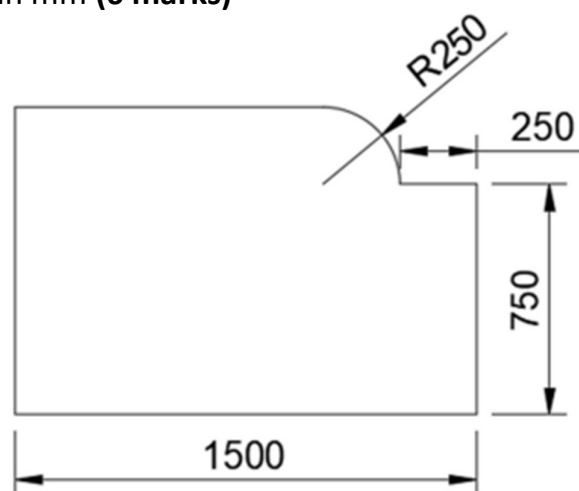
Q4) A designer has decided to get a patent for an invention. Name the office in the UK that grants patents **(1 mark)**

Q4b) Evaluate the use of a patent to protect a design idea **(6 marks)**

Q4d) The role of the British Standards Institute (BSI) is to promote safety and quality throughout product manufacture and usage.

Evaluate the advantages and disadvantages to a business of ensuring their practices and products comply with BSI standards **(8 marks)**

Q4e) Some sheet metal is being cut for a car door. If the density of the metal is 2.8g/cm^3 and the metal is 6mm thick. What is the mass of the sheet metal? All measurements are in mm **(6 marks)**



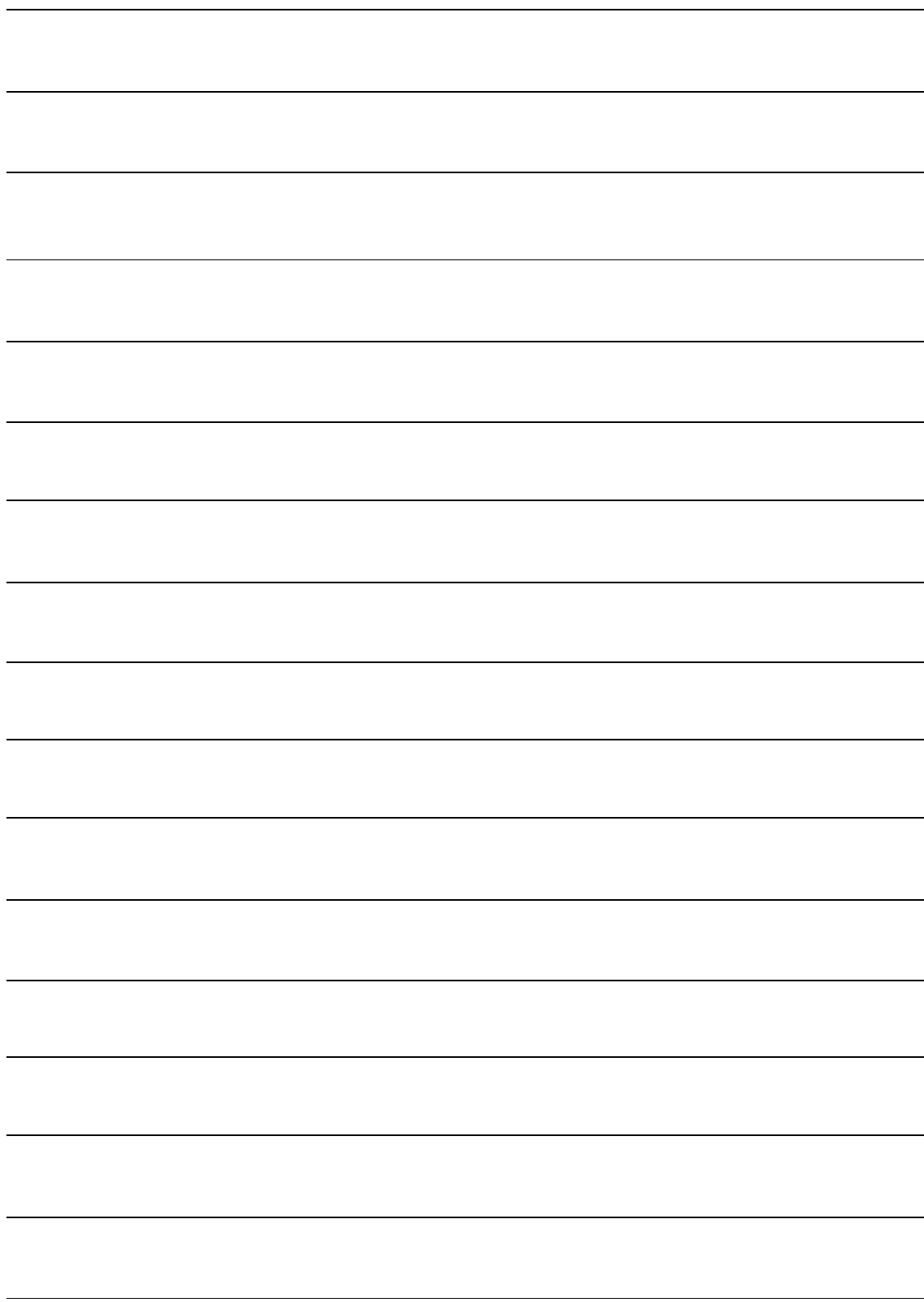
Q5) The plastic tugboat is made from polyethylene.



Q5a) Discuss the suitability of polymer-based materials for children's toys during play activities. **(6 marks)**

Q5b) The tugboat will be made in two parts and joint together using solvent adhesive. Explain the safe work practices necessary to protect workers when using solvent adhesives **(6 marks)**

Q6) Evaluate the use of a flexible manufacturing system, compared to dedicated automated machinery, in production **(9 marks)**



Q7) The image shows Otto Wagner's Majolica House designed and constructed during the Art Nouveau period.



Discuss how the design of the Métro station entrance was influenced by Art Nouveau philosophies. **(9 marks)**

Q8a) Phosphorescent pigment can be used in indoor emergency signage

Explain **three** reasons why phosphorescent pigment is suitable for indoor emergency signage. **(9 marks)**

1.

2.

3.

Q8b) Before the signs are made a critical path analysis will be undertaken. Give **three** features of critical path analysis. **(3 marks)**

[illegible]

Q10) Evaluate the functionality of the Dyson Zone headphones with reference to aesthetics and user requirements within an urban lifestyle context. **(12 marks)**



END OF PAPER