

Design & Technology

Eduqas GCSE

Papers and boards

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!

Q1. What does a micron measure?

- A** The weight of paper
- B** The thickness of card and board
- C** The size of a sheet of paper

Q2. Which of the following weights is most likely to be card?

- A** 80gsm
- B** 220gsm
- C** 400gsm

Q3. What are the dimensions of an A4 sheet of paper?

- A** 148mm × 210mm
- B** 210mm × 297mm
- C** 297mm × 420mm

Q4. Which paper is semi-transparent and used for initial ideas and marker rendering?

- A** Layout paper
- B** Cartridge paper
- C** Copier paper

Q5. Which board scores and folds without cracking and is used for cereal boxes?

- A** Mounting board
- B** Foam core board
- C** Folding boxboard

Q6. Why can paper only be recycled about 5 to 7 times?

- A** The ink cannot be removed
- B** The paper fibres get shorter each time
- C** The paper becomes too heavy

Q7. Corrugated cardboard is used for packaging.

Q7a. The weight of paper and cardboard is measured in gsm. State the full meaning of gsm. **(1 mark)**

Q7b. State how the structure of corrugated cardboard makes it suitable for packaging. **(1 mark)**

Q7c. Describe one disadvantage of corrugated cardboard when used to make models. **(2 marks)**

Q8. This question is about ISO paper sizes.

Q8a. Complete the table to give the correct sizes for a sheet of A3 paper. **(2 marks)**

ISO paper size	Paper dimensions
A4	210mm × 297mm
A3	
A2	420mm × 594mm

Q8b. A standard business card is 55mm × 85mm. Calculate how many business cards could be printed on one A2 sheet of material. Show all workings. **(3 marks)**

Q9. This question is about laminated and corrugated boards.

Q9a. A child's puzzle is made from a laminated board. Describe how a laminated board is formed. **(2 marks)**

Q9b. Corrugated cardboard packaging for a drinking cup is cut from a sheet measuring 297mm × 420mm. State the correct ISO size the packaging would be cut from. **(1 mark)**

Q9c. Describe why corrugated cardboard is a suitable material for the packaging of the drinking cup. **(2 marks)**

Q10. A robot building kit is made from card, and 60% of the card is made from recycled paper. Describe one disadvantage of using recycled paper for this product. **(3 marks)**

Q11. Food packaging products include a pizza box, a foil-lined paper bag for warm food and a duplex board cake box.

Q11a. State the name of a suitable material for the pizza box. **(1 mark)**

Q11b. The material used for the pizza box is made of three layers. State the name of the middle layer. **(1 mark)**

Q11c. Evaluate why a designer selected a foil-lined paper bag for warm food and duplex board for the cake box. **(6 marks)**

Q12. Environmental concerns have meant recycled papers and boards are being used to manufacture products that traditionally have used plastic. Evaluate the disadvantages of this shift in manufacturing practice. **(6 marks)**

Answers

Q1. B

Q2. B

Q3. B

Q4. A

Q5. C

Q6. B

Q7a.

Grams per square metre (1). Only acceptable answer.

Q7b.

1 mark for any of: the liners and fluting form a series of connected arches which are impact resistant; shock absorbing; strength; light in weight.
(Corrugated board is two liners glued to a corrugated inner layer called the fluting, which together are stronger than each layer on its own.)

Q7c.

For example:

- It is difficult to create neat folds (1), as the inner layers dictate the shape of the fold (1), which is not always the direction wanted (1)
- It has a rough, ridged appearance that is prone to wrinkling and bending (1), so it is only good where resilience isn't needed (1)
- It is difficult to get the angle perfect when cutting (1) because of its layered construction
- It is brown in colour (1), which is not a desirable finish if appearance is important (1)
- Untidy appearance when cut; bends and crumbles under sideways pressure; softens and becomes pulpy in moisture

Q8a.

297mm × 420mm (2). Only acceptable answer.

Q8b.

A2 = 420mm × 594mm. Award marks for correct working towards the best layout:

- Layout 1: $420 \div 85 = 4.94$ and $594 \div 55 = 10.8$, so $4 \times 10 = 40$ cards
- Layout 2: $594 \div 85 = 6.99$ and $420 \div 55 = 7.64$, so $6 \times 7 = 42$ cards
- Answer = 42 cards

Q9a.

Up to two marks for an accurate description. For example: laminated boards are formed by gluing (1) layers/veneers (1) together. Award 1 mark if an example of a laminated board is given as part of the description.

Q9b.

A3 (1). Only acceptable response.

Q9c.

One mark for a reason and one mark for an explanation; a maximum of one mark for simply stating a reason. For example:

- The fluted structure absorbs knocks and bumps (1), stopping the cup being damaged in transport (1)
- It is light in weight (1), limiting the cost of postage/transport (1)
- It is made from recycled materials (1), making it more sustainable than other packaging materials (1)
- Heat resistance is not accepted

Q10.

One mark for a correct disadvantage; maximum marks for a clear description of it. Disadvantages of recycled paper:

- Fibres get shorter, which reduces the strength of the paper
- Short fibres mean there is less flexibility
- Water absorption increases, which doesn't help the function of the toy kit
- The quality of the paper is reduced
- Chemicals are used during recycling to remove ink

Q11a.

Corrugated cardboard (accept cardboard) (1).

Q11b.

Flutes/fluting (accept corrugation) (1).

Q11c. (6 marks)

Answers must evaluate both the foil-lined paper bag and the duplex board for full marks.

Foil-lined paper bag

- Advantages: light in weight; good strength to weight ratio for a one-use product; the foil insulates and keeps food warm for longer; oil and grease resistant so better to hold; the paper gives a surface for printing branding; the foil adds rigidity; easy and cheap to manufacture
- Disadvantages: the thin paper doesn't stop all heat reaching the hand as aluminium foil conducts heat; foil is non-renewable and won't biodegrade; the paper backing makes recycling complex; often ends up in landfill

Duplex board

- Advantages: rigid, stable and protects the cakes; light in weight; double-ply for strength; smooth surface for printing; wax coating resists spills and keeps cakes fresher for longer; bleaching makes it brighter and whiter
- Disadvantages: not made from recycled paper for hygiene reasons, so less sustainable; the coating makes it hard to recycle; often ends up in landfill

Band	Marks	Descriptor
3	5 to 6	A coherent answer with detailed, relevant knowledge and understanding. Relevant examples and well-developed, substantiated judgements in a logically structured response.
2	3 to 4	Some coherence, with partial knowledge and understanding. Mostly relevant examples and partly substantiated judgements in a generally well structured response.
1	1 to 2	Basic knowledge and understanding. Limited relevant examples or judgements, with little structure.

0	0	Incorrect or irrelevant answers.
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Q12. (6 marks)

Responses may refer to the points below:

- The plastics that paper and card replace are often cheaper to produce and can be made to suit a specific need
- Papers and boards don't share the same characteristics, so can be less strong or sturdy
- They often need to be made as composites to gain some of the plastic's characteristics
- Composites are more difficult to dispose of and more expensive than the original material
- However, regulations still allow them to be branded as "greener"

Band	Marks	Descriptor
3	5 to 6	Clear understanding that cards and boards are used mainly for sustainability, but will not have the same working properties as plastics. Reference to the cost of improving these properties.
2	2 to 4	Some understanding of the disadvantages of using papers and boards in place of other materials. More than one issue referenced, but less detail than Band 3.
1	1	Little understanding; one issue referenced but lacking detail.
0	0	Incorrect or irrelevant answers.