

OCR A-Level

Designing for Manufacture (DFM) Principles (3.2a)

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. Why do manufacturers create economical lay plans?

- A** To reduce the amount of material wasted during production
- B** To improve the speed of product transportation
- C** To make the product more visually appealing

Q2. What is the main reason for costing in manufacturing?

- A** To find out which materials look the best
- B** To calculate expenses and set a suitable selling price
- C** To decide how products should be advertised

Q3. Why is it important to work to a budget in manufacturing?

- A** To ensure production stays financially viable
- B** To guarantee that the factory runs faster
- C** To make products more colourful

Q4. What is one benefit of reducing material waste?

- A** Lower production costs and reduced environmental impact
- B** Longer production times and higher costs
- C** Greater difficulty in meeting deadlines

Q5. How can computer-aided design (CAD) help with material optimisation?

- A** By automatically colouring the product design
- B** By arranging parts to minimise waste in lay plans
- C** By increasing the number of workers needed

Q6. What could happen if a manufacturer ignores costing and budgeting?

- A** The product may become too expensive to produce profitably
- B** The product will automatically be more sustainable
- C** The quality of materials will always improve

Q7. The image shows a hover board and a replacement shell for the hover board.



Describe two ways that the principles of designing for manufacture (DFM) have been incorporated in the design of the outer shell of the hover board **(4 marks)**

Q8. The image shows a hearing aid.



Explain how the hearing aid components could have been designed for disposal and end of product life. **(3 marks)**

Answers

Q1. A

Q2. B

Q3. A

Q4. A

Q5. B

Q6. A

Q7.

Possible ways may include:

- The design includes integral fixings to join the two parts together (1) this minimises assembly and gives greater accuracy (1).
- The shell is screwed together which means the product can be dismantled (1) and then can be repaired, or parts re-used (1).
- The design is symmetrical (1) so it minimises any re-orientation of each section when the product is being assembled (1).
- Any other valid suggestion for given context.

Q8.

Possible explanations may include:

- They could have been designed for disassembly with the labelling of materials on the casing parts for the ease of separating components (1) and joined with semi-permanent standardised fixings like screws(1) so they could be sorted and re-used, recycled etc. (1)
- The parts of the hearing aid (tubing/ speaker/ microphone) could be use of standardised components that can be re-used on other products (1) The use of a neutral colour so other users could use the same casing (1) They could have optimised the materials so that there is less material wasted at the end of life (1)
- Other possible references could include the use of biodegradable materials, Resin Identification Codes and snap fittings. Any other valid suggestion.