

Design & Technology

AQA GCSE

Scales of production

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 might someone choose to use one-off manufacturing to make a product?

- A** Product made to fit user
- B** Quicker to produce
- C** Less labour intensive

Q2. What is one-off manufacturing used to make?

- A** Books
- B** Sports cars
- C** Bespoke furniture

Q3. Which scale of production method can adjust to market trends?

- A** Batch
- B** Mass
- C** Continuous

Q4. Which scale of production usually has the lowest unit cost?

- A** Batch
- B** Mass
- C** Continuous

Q5. Which scale of production usually has the lowest unit cost?

- A** Plastic bottles
- B** Cars
- C** Newspapers

Q6. What 2 scales of production have a high initial set-up cost?

- A** Batch, Continuous
- B** One-off, Mass
- C** Mass, Continuous

Q7. What is an advantage of using mass production?

- A** Can respond to market change
- B** Less labour costs
- C** Can be made to personal specifications

Q8. Which scale of production is used to print newspapers?

- A** Batch
- B** Mass
- C** Continuous

Q9. Different products are made in different volumes using the production methods in the table below.

| | | | |
|------------------------|-------|------|------------|
| One-off / Prototype | Batch | Mass | Continuous |
|------------------------|-------|------|------------|

Discuss the advantages and disadvantages of manufacturing in quantity compared to producing a one-off item. You should refer to the production methods in the table and give examples in your answer. **(8 marks)**

[illegible]

Q10. Explain why the two methods below are used to manufacture products in different volumes. Give specific examples of products in your answer. **(2 x 3 marks)**

Mass

Batch

Answers

Q1. A

Q2. C

Q3. A

Q4. B

Q5. A

Q6. C

Q7. B

Q8. A

Q9.

Expect candidates to talk about different scales of production, particularly batch, mass, and continuous production for manufacturing in quantity.

Prototype/one off

- Used to make an early version of a product/system to test a concept and see how well a component/part/feature works e.g., toile for a dress, concept vehicle.
- Used for a unique/personalised piece of work/product e.g., jewellery, handmade suit, where only one example will be required.
- 3D printing can be used to rapidly create a one-off prototype product of concept e.g., artificial implants used in surgery.
- This production technique is used where the manufacturer usually can work directly with the customer/end user /client and meet their very specific and personalised requirements e.g., wedding dress.
- Very labour intensive using highly skilled persons.

Batch

- Used where a specific number of a product are required.
- Using jigs and templates in batch production allows more of a component to be made later.
- Small changes between batches e.g., colour of phone cases is possible.
- Products/systems are produced in a higher volume than one-off /prototype production but less than mass and continuous production.
- Products created are identical and usually referred to as a batch e.g., rolls of wallpaper, components, perishable foods.
- Batches can be very small or quite large depending on complexity.

- Technique makes use of highly skilled persons to make products, but repetitive nature of batch production may require production lines and the use of jigs, former, templates and stencils to ensure consistency.

Mass

- Items tend to be consistently used where there is little change in the design eg white goods and electrical goods.
- Mass production involves high initial start-up costs in equipment and machinery that is recouped due to larger production runs e.g., car manufacture where product costs can be reduced and passed on to customers.
- Increasing levels of automation and use of robots to speed up production, minimise waste and increase efficiency.
- Mass production makes use of highly skilled technicians to keep the production line running smoothly.
- Minimal downtime in production to keep production rates high.

Continuous

- Where simple products or components are continually in demand and never change e.g., screws, zips, switches, resistors.
- Like mass production, but production lines run 24/7.
- Trying to keep production costs as low as possible so products can be produced for as little as possible.
- Staff usually low skilled.
- Very high levels of automation e.g., pick and place machines for PCB assembly.
- Factories using commercial production techniques make a very limited number of products (limited range) with few or no changes to the product.

Q10.

Mass

- Used to produce products in tens of thousands/ large production runs eg TVs, fridges, microwave ovens.
- Highly suited to products that can be made using automated manufacturing techniques requiring minimal human involvement eg packaging and leaflets.
- Where a large number of identical products are known to be needed, making it worthwhile setting up a dedicated production line.

- Used where efficient material use is paramount to ensure a cost effective product with minimal waste/ zero defects to keep product costs low eg mobile phones.

Batch

- Suited to small quantities of a product or slight variations of a product eg perishable goods like food, chemicals (adhesives & paint), home furnishings (wallpaper and tiles) some medical supplies etc.
- Batches can be in single figures or several hundred depending on what the product is eg set of dining chairs, bridesmaid dresses
- Extensive use of jigs, templates and moulds to assure consistency across a batch.
- Opportunities for CAD/CAM to allow flexibility in manufacturing different batches of products.
- Quick change over between one batch of products and another without time consuming human involvement eg manufacture from a CAD file.
- Economies of scale as some materials/ components can be sourced/purchased in bulk.