

Design & Technology

AQA GCSE

Production techniques and systems

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 is a **disadvantage** of using robots in production?

- A** Not as safe as human workers
- B** Not as flexible as humans
- C** Inexpensive set up costs

Q2. Why might a manufacturer choose a robot over a human worker?

- A** Able to repeat repetitive tasks
- B** Can perform multiple roles
- C** Cheap to maintain

Q3. CAD stands for?

- A** Computing and design
- B** Computer-aided diagram
- C** Computer-aided design

Q4. CAM stands for?

- A** Computer-aided modelling
- B** Computer-aided making
- C** Computer-aided manufacture

Q5. Sketching is used by designers to communicate information. Describe **one** advantage and **one** disadvantage of freehand sketching over computer aided design (CAD) drawing **(2 x 2 marks)**

Q6. Explain the importance of the efficient supply of materials and components in a Just In Time (JIT) manufacturing process **(6 marks)**

Q7. A virtual model of a new hockey stick has been created using CAD. Explain two reasons for creating a virtual model of a new hockey stick **(4 marks)**

Answers

Q1. B

Q2. A

Q3. A

Q4. C

Q5.

Advantages

- Freehand sketching can be done with simple equipment, eg a pencil and paper where CAD requires software and hardware which is more expensive.
- Cheap requiring only a pencil & paper =1
- Cheaper than Cad requiring only a pencil and paper and not a computer = 2
- Sketching can be done anywhere. With CAD drawing you need software and a PC etc.
- Quick and easy to add shade and tone to create a realistic effect. No need to use lots of PC power to complete a render etc.
- A sketched drawing can be completed in as little or as much time as you want to spend.
- A great way of recording new ideas quickly if you do not have access to a CAD package and computer.
- Freehand sketching does not require you to know how to use complex Cad software.
- Less susceptible to cyber-crime and theft.

Disadvantages

- Not as accurate = 1
- Drawings may be unclear if you are not very good at drawing, where you can be more precise drawing in a CAD package.
- A paper drawing can be damaged if it gets wet whereas you can save a CAD drawing electronically.
- You cannot share a sketched drawing like you can with CAD files where several people can access information at one time all around the world.

- Cannot output sketch to machine for Cam directly • Storage space for physical drawing unlike a data file is larger.
- Mistakes can be expensive requiring a sketch to be redrawn whereas in CAD it is easy to edit or undo mistakes without restarting a piece of work.

Q6.

- Components are not stockpiled so scheduled deliveries must be on time to minimise disruption to manufacture
- Delay in deliveries will affect the productivity of the manufacture, in severe cases
- Limited storage is available so stock piles must be regularly topped up and maintained
- JIT manufacture allows for flexibility on the production line so customers' orders must arrive on time and consistently in order to prevent down time
- Suppliers can be selected by proximity to the assembly plant to reduce travel time and disruption
- Machinery and layout in the factory should be optimised to allow for efficient delivery of components
- Stock is managed by computer systems
- RFID identification is used to track products through the factory and automatically select the correct parts to install and order stock when necessary

Q7.

Any two reasons explained from:

- Products can be viewed / seen all round / 3D / see what it looks like / coloured / textures added (1) therefore a true and accurate representation can be gained from the computer model (1)
- Designs can be edited / modified / viewed all round on screen without having to redraw / physically modelled (1) which saves time / materials / speeds up any development (1)
- Files can be sent electronically via email (1) which saves time / reduces costs / speeds up the whole design and make process (1)
- Files can be output to 3D printing / rapid prototyping machines (1) which enables real models to be produced to test / hold / evaluated (1)

- Computer simulations such as stress / strain tests can be carried out (1) which will allow the designer to see if the hockey stick will be able to withstand the forces / impacts it will be subjected to when playing (1)