

Design & Technology

AQA A-Level

The use of computer 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. Which system uses reprogrammable machinery to switch production between product types quickly?

- A** Modular Production
- B** Flexible Manufacturing Systems
- C** Mass Production

Q2. Computer-controlled robots in warehouses automatically sort and dispatch goods. This relates to:

- A** Production and distribution
- B** One-off prototyping
- C** Bespoke design processes

Q3. Using pre-made bolts and screws from a specialist supplier reduces:

- A** Reliance on standardised components
- B** Development time and production costs
- C** Flexibility in design

Q4. Which system focuses on rapidly adapting production to short-term changes in customer demand?

- A** Just in Time (JIT)
- B** Quick Response Manufacturing (QRM)
- C** Vertical In-house Production

[illegible]

[illegible]

Answers

Q1. B

Q2. A

Q3. B

Q4. B

Q5.

- A series of CNC machines are located in close proximity to each other in a cell, within a manufacturing facility to reduce the distance and time taken to move a component around a large manufacturing facility.
- Should any larger distance need to be covered automatic guided vehicles (AGV's) would be used that take the most efficient path and communicate with the other AGV's.
- The machines are organised in a logical sequence corresponding to the order in which they will be used to limit movement time and maximise efficiency.
- The loading and unloading of each machine is automated and performed by a robotic arm. This ensures accuracy and efficiency as the movement of the workpiece is programmed to take the most direct path. There is no human error in either the transfer or in the removal/installation of the workpiece.
- Some cell production may include manual machines and in these situations the operators are highly skilled and familiar with all of the machinery in their cell, allowing them to job share.
- These cells are often rewarded for their productivity and as a result there is a shared desire to hit targets which in turn has a positive effect on the efficiency of a cell.

Q6.

- They allow the company to make use of specialist manufacturers of a particular component, making financial savings by not having to produce the range of components themselves.
- A product manufacturer may not have the expertise or ability to produce all necessary components in house, so it would be necessary for them to use bought-in components from other suppliers and manufacturers.
- It allows companies to buy in bulk from a variety of suppliers allowing them to secure the best price and unit cost.

- It can speed up the manufacturing process by ensuring that sufficient quantities of the component are available.
- It provides manufacturers with the assurance of consistency, meaning that components can be designed around a stock size or form, eg nuts, bolts, rivets etc.
- Provides the manufacturer with peace of mind that the components will be of the correct standard as companies will have produced the components in line with ISO 9001.