

OCR A-Level

How is manufacturing organised and managed for different 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 a company buy in standardised parts?

- A** Readily available
- B** Unique designs available
- C** More quality control

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. What does CNC stand for?

- A** Computer Numerical Coordinates
- B** Computer Numerical Control
- C** Computer Numerical Coaxial

Q4. Why might a manufacture choose a human over ASRS?

- A** Humans can spot faulty parts
- B** Humans are cheaper
- C** Humans are safer

Answers

Q1. A

Q2. A

Q3. B

Q4. A

Q5.

- Flow (1) design of processes that result in uninterrupted flow from raw materials to delivery of the finished product (1) including the use of JIT (1)
- Pull (Kanban) (1) design of manufacturing systems for 'pull' of the product through the process (1) as a response to demand (1)
- Perfection (Kaizen) (1) adopting an approach that continually improves working processes (1) resulting in getting it right first time (1)

Q6.

- They allow the company to make use of specialist manufactures of 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 bulk buy 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 enough of the component are available.
- It provides manufacturers with the assurance of consistency meaning the components can be designed around a stock size or form, e.g. nuts and bolts
- 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

Q7.

- 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.