

Y10-KO4-GCSE DESIGN AND TECHNOLOGY: PRODUCTION TECHNIQUES AND SYSTEMS

A COMPUTER AIDED DESIGN (CAD)

1	Ex ample	2D design, Solidworks, Fusion 360, Photoshop....etc.
2	Advantages	<ul style="list-style-type: none"> • Easy to change designs. • Designs are easily saved and sent. • Can be worked on by multiple people simultaneously. • Can be used for virtual testing. • Can produce high-quality designs .
3	Disadvantages	<ul style="list-style-type: none"> • Complex and time-consuming to learn. • Expensive to buy. • PCs can crash or be hacked – causing work to be lost. • Takes up PC memory.

B FLEXIBLE MANUFACTURING SYSTEMS

1	Definition	FMS is where automated machines are adaptable and can produce different products if needed.
2	Key information	If a manufacturer is making a product with machines that are just dedicated to specific tasks they have to be reprogrammed and re-tooled before changing to a new task. This is time consuming and expensive.
3	Ex ample	CNC machines, 3D Printers, laser cutters and robotic arms.

C LEAN MANUFACTURING

	Key information	
1		This is where waste and energy is kept to a minimum in areas including: overproduction, waiting, transportation, inappropriate processing, excessive inventory, unnecessary motion and defects.
2		This helps manufacturers save money and resources in production, as well as helping minimise the environmental impact of producing products.

D COMPUTER AIDED MANUFACTURE (CAM)

1	Ex ample	3D printing, laser cutting, CNC router, Automated machines and robotics....etc.
2	Advantages	<ul style="list-style-type: none"> • Faster and more accurate than traditional tools. • Repetitive accuracy/ consistent outcomes. • Machines can run 24/7.
3	Disadvantages	<ul style="list-style-type: none"> • Expensive to buy the equipment...etc.. • Training takes cost and time. • Need specialists to maintain and repair the machines. • Dependence on CAM can cause unemployment.

E JUST-IN-TIME MANUFACTURING

1	Definition	This is where manufacturers only order materials, parts...etc when needed. The customer's order triggers the production process and the resources needed for that order are the only ones bought.
2	Key information	This can be used in any scale of production but is particularly useful for one-off production.
3	Advantages	<ul style="list-style-type: none"> • Saves on warehouse and storage costs. • Money is not tied-up in stock. • Little/minimal waste. • Customer often pays in advance so money is secure before production.
4	Disadvantages	<ul style="list-style-type: none"> • All production stops if a part/ material is missing. • Needs to have a fast, reliable and good quality supply chain to work properly. • Can be time-consuming.