**Design & Technology**

**AQA GCSE** Logo

Description automatically generated with low confidence

**Commercial processes**

**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 process is commonly used for mass-producing printed materials like books and packaging?

**A** Weaving

**B** Offset lithography

**C** Flow soldering

**Q2.** What is the primary purpose of die cutting in paper and board manufacturing?

**A** To join layers of material together

**B** To apply ink to the surface

**C** To cut precise shapes out of sheet materials

**Q3.** Which machine tool is used to hollow out wood in woodworking?

**A** Lathe

**B** Router

**C** Extruder

**Q4.** Injection moulding is most associated with which group of materials?

**A** Timber

**B** Metals

**C** Polymers

**Q5.** Name one specific commercial manufacturing process and describe what it is used for. Using notes and/or sketches describe the process you have named above **(4 marks)**

**Answers**

**Q1**. B

**Q2**. C

**Q3**. B

**Q4**. C

**Q5.**

|  |  |  |
| --- | --- | --- |
| Papers and boards | Offset lithography Screen printing Digital printing | Printing design and information on paper and card. |
| Die cutting | Cutting out of nets. Making perforations. Creasing of card. |
| Timber based materials | Routing | Production of grooves, rebates and joints. |
| Turning | Turning cylindrical objects and shapes. |
| Lamination | Bonding layers of veneers or laminas together to create a large flat board or a complex curved shape using a former. |
| Machine morticing | Cutting square or rectangular holes in a piece of timber to create joints. (Also note that mortices often have round ends so must be considered if in answer). |
| Metal based materials | Milling | Horizontal or vertical milling of a flat surface, groove, rebate or hole |
| Casting | Redistribution of metal in molten form to fill a mould or cavity |
| Welding | Redistribution of at least 2 pieces of metal along and edge/spot/seam to create a permanent joint. |
| Brazing | Use of solder to join two or more pieces of metal together without physically melting them. |
| Sintering | The compression of powdered metals in a die using heat and extreme pressure to create a solid product in final shape. |
| Polymers | Injection moulding | The heating and injection of molten polymer into a mould to produce a 3D shape. |
| Extrusion | Where molten polymer is extruded through a die to produce a consistent shaped profile. |
| Vacuum forming | Heating of sheet polymer so that it softens and can be shaped in a mould by extracting the air between the material and the form. |
| Calendaring | Manufacture of thin  thermoplastic film. |
| Rotational moulding | Used to manufacture hollow 3D products using an enclosed mould containing thermoplastic polymer in powder form. |
| Blow moulding | Polymer in tube form is extruded (parison), the end sealed and hot air blown in to forcing the polymer out into a mould to create a hollow shape. |
| Textile based materials | Weaving | Fabrics are woven on looms to produce large rolls of cloth in either plain or repeating patterns. |
| Dying | Fibres are dyed commercially before weaving to establish a fibre colour dying can be done by batch dying in a tank or continuous dying using various tanks and rollers to move the fabric along. |
| Printing | Roller printing, screen printing and digital printing all transfer images to the fabric. |
| Machine sewing | Specialist sewing techniques like the overlock stitch can be used to create a tough and durable edge, hem or seam. |
| Electrical and mechanical systems | Pick and place assembly | Used to select and position individual components in predetermined positions quickly and consistently on a PCB. |
| Flow soldering/ Reflow soldering | Used in surface mounting of electrical components. Components are located on a PCB on pre-soldered pads. PCB is then placed in a reflow oven where the solder melts connecting the component to the PCB. |
| Wave soldering | Circuit boards have pre drilled holes with components located in position. PCB board then moves on a conveyer belt over a molten solder wave, bonding the components to the PCB as the solder cools. |
| PCB manufacture Etching | Different to photoresist PCB manufacture done in school by spraying the etch directly onto a developed PCB board. |
| PCB lacquering | Application of a polymer layer to protect PCB from corrosion, dust and dirt. |

**Q10.**

**Q11.**