**Design & Technology**

**AQA GCSE** Logo

Description automatically generated with low confidence

**Sources and origins**

**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 the purpose of timber seasoning?

A To reduce moisture content

B To increase moisture content

C To reduce sap content

**Q2**. What is the purpose of debarking in paper production?

A To soften wood fibres for pulping

B To remove outer layers of bark and branches

C To add chemicals for sizing

**Q3**. What does sizing do to paper?

A Makes it more absorbent

B Stops it from being absorbent

C Strengthens the wood fibres

**Q4**. What process separates metal from ore using high heat?

A Smelting

B Mining

C Fractional distillation

**Q5**. What is the main source of polymers?

A Trees

B Crude oil

C Metal ores

**Q6**. What does fractional distillation do?

A Extracts metal from ore

B Breaks down crude oil into usable elements

C Combines short fibres into yarn

**Q7**. What is the purpose of carding in textile production?

A To spin fibres into yarn

B To bond fibres with moisture

C To align fibres in the same direction

**Q8**. Which process twists fibres into yarn?

A Felting

B Spinning

C Combing

**Q9.** Choose one of the material categories in the table below.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Metal based materials | Paper and boards | Polymers | Textile based materials | Timber based materials |

**Q9a.** Give the source or origin of your chosen material category **(1 mark)**

**Q9b**. Name one process used to convert your chosen material category into a workable form **(1 mark)**

**Q9c**. Using notes and/or sketches describe the process you have named above **(4 marks)**

**Answers**

**Q1**. A

**Q2**. B

**Q3**. B

**Q4**. A

**Q5.** B

**Q6.** B

**Q7**. C

**Q8**. B

**Q9a**.

|  |  |
| --- | --- |
| Material | Source/Origin |
| Metal based materials | Rocks or Ore |
| Papers and boards | Trees, forests, woods and plant fibres |
| Polymers | Crude oil and plants |
| Textile based materials | Natural fibres |
| Timber based materials | Trees, forests or woods |

**Q9b**.

See below

**Q9c**.

|  |  |  |  |
| --- | --- | --- | --- |
| Material area | Source / origin | Name a process used to convert your chosen material category into a workable form | Describe how your named process converts your chosen material category into a workable form |
| Paper and board | Trees and plants | Debarking, chipping, shredding, pulping, sizing | * **Debarking** – removal of outer layers of bark and branches before chipping to make pulp. * **Chipping**/shredding – logs are converted into chips to make more manageable smaller pieces of wood which are easier to treat with chemicals before pulping. * **Pulping** – a mechanical/ shredding process involving cooking wood chips in chemicals in large tanks to soften wood fibres and make a pulp. * **Sizing** – a finishing process where the wood pulp is beaten with chemicals and other additives. Sizing stops the paper from being absorbent so it can be printed on |
| Timber based materials | Trees | Felling or Debarking Conversion & sawing Seasoning | * **Felling** – extracting living trees from forests, * **Debarking** -removal of bark, branches and creation of logs * **Conversion & sawing** – Conversion of logs into planks (rough sawn) to make them more manageable and easier to handle. * **Seasoning** – reduction of the moisture content in timber to make it less prone to shrinkage and movement. Can be naturally or kiln dried |
| Metal based materials | Rocks and ore | Mining Smelting | * **Mining** – extraction of rocks from the ground (ore) containing naturally occurring metal elements. * **Smelting** – heating of metal in ore form at high temperatures in a furnace to extract metal from the rock. The separation process involves the removal of impurities and this is called slag |
| Polymers | Ground/ earth’s crust | Fractional distillation Refining/ cracking | * FD – conversion of crude oil into its more usable elements e.g. diesel and petrol. * Refining/cracking –conversion of long chain hydrocarbons into more usable ones e.g. petrol. Heat and catalysts are used to facilitate this process |
| Textile based materials | Plants and animals | Carding /combing Spinning Felting/ bonding/ needle bonding | * **Carding** – using staple (short) Fibres they are combed to make sure they all lie in the same direction before twisting to form a yarn. * **Spinning** – where fibres are spun or twisted into a yarn. These can be filament fibres (smooth yarn) or staple fibres (hairy/fluffy yarns). * **Felting/bonding** – laying the fibres randomly in a web, moisture and agitation to mat fibres together |