**Design & Technology**

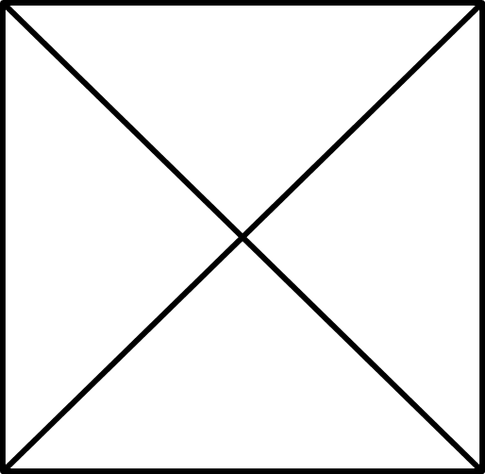
**A-Level**

**Metal Processes 2**

**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
* Use a cross in the box to mark you 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 a disadvantage of most welding techniques?

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**A** Creates weak joint

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**B** Requires high skilled worker

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**C** Need electricity supply

**Q2.** Why might spot welding be used over TIG/MIG welding?

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**A** Quicker and easier to do

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**B** Stronger joint

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**C** Complex shapes can be welded

**Q3.** What might soft soldering be used to make?

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**A** Bicycle frames

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**B** Automotive engineering

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**C** Electronics

**Q4.** What is an advantage of pop rivets over snap rivets?

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**A** Only need access to one side of metal

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**B** Easier to undo joint

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**C** Its stronger

**Q5.** Why is brazing typically used in schools?

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**A** Needs little training/equipment

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**B** No flux is needed

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**C** Weld has good aesthetics

**Q6.** What is the purpose of washers?

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**A** Used to lock the joint

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**B** Used to increase friction

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**C** Used to spread pressure

**Q7.** Why is welding mask worn for many welding types?

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**A** To protect from heat

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**B** To protect from blindness

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**C** To protect from sparks

**Q8.** What is a limiting factor for spot welding?

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**A** Width of metal

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**B** Electrode strength

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**C** Metal thickness

**Q9**. The figure shows one of the rivets used to attach the wooden handle to the spatula.

A picture containing arrow

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**Q9a**. Describe the process of riveting using this type of rivet. **(6 marks)**

**Q9b**. Explain **two** reasons why rivets were used to attach the wooden handle to the spatula. **(4 marks)**

**Q10**. Give **two** benefits, other than cost, of using standardised parts. **(2 marks)**

**Q11**. Describe the appropriate PPE to be worn before TIG welding **(4 marks)**

**Q12**. What is the purpose of carbon dioxide, during MIG welding? **(2 marks)**

**Q13**. Many non-ferrous metals can be joined using hard soldering.

Describe the process of hard soldering. **(4 marks)**

**Answers**

**Q1.** B

**Q2.** A

**Q3.** C

**Q4.** A

**Q5.** A

**Q6.** C

**Q7.** B

**Q8.** C

**Q9a**.

* drill holes (1)
* countersink holes (1)
* insert rivet (1)
* support rivet head (1)
* hammer over rivet (1)
* flush off excess material (1).

**Q9b**.

* Strong method of attachment (1) for dissimilar materials (1).
* It is an automated process of joining (1) that can be done rapidly (1).
* Rivets give an aesthetic feature (1), which suggest a higher quality of product (1).

**Q10**.

* readily available (1)
* specification data is already known/predetermined (1)
* design decisions are simplified (1)
* consumer can source replacements easily/quickly (1)
* manufacturer does not need to stockpile/can order in when required (1)
* time saved by buying in/not designing and making custom parts/components (1).

**Q11**.

* Welding mask/goggles (1)
* Leather apron (1)
* Leather gloves
* Welding/safety shoes

**Q12**.

* Carbon dioxide gas is supplied directly to the welding zone (1)
* Protecting the area from atmospheric contaminants (1)

**Q13**.

* Metal cleaned with an abrasive (1)
* Work clamped / wired together (1)
* Flux applied (1)
* Heat applied (1)
* The solder cut up/applied/fed-in (1)
* A stated temperature between 625 - 800 C (1)
* Solder melts / flows round the joint (1)