

OCR A-Level

Ferrous and Non-Ferrous Metals

(5.2aiii)

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 of the following properties is the primary reason for selecting stainless steel over mild steel in food preparation surfaces?

- A** Higher thermal conductivity
- B** Superior corrosion resistance
- C** Greater ductility

Q2. A component requires good electrical conductivity and must resist atmospheric corrosion. The most suitable metal would be:

- A** Mild steel
- B** Cast iron
- C** Copper

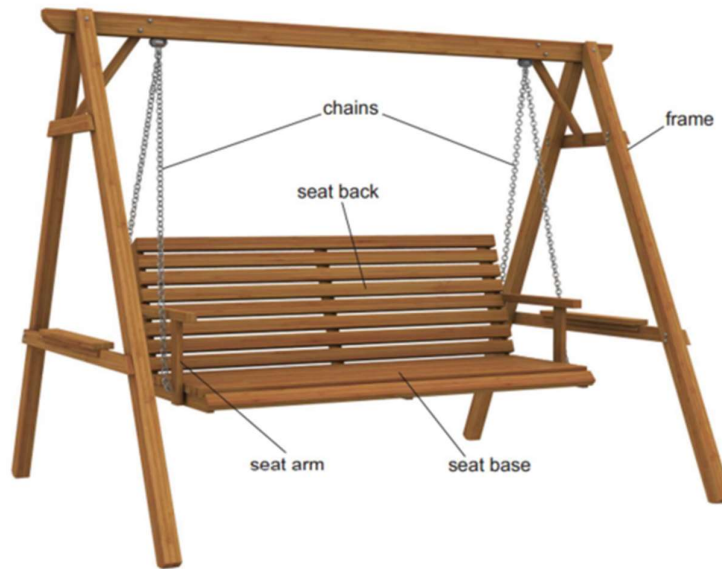
Q3. The main alloying element that distinguishes stainless steel from other steels is:

- A** Chromium
- B** Nickel
- C** Carbon

Q4. Which material would be least suitable for a lightweight, high-strength structural application such as an aircraft frame?

- A** Aluminum alloy
- B** Mild steel
- C** Stainless steel

Q5. The image below shows a swing seat manufactured from hardwood.



A metal chain connects the swing seat to the frame. Identify a suitable metal for the manufacture of the chain. Justify your answer. **(2 marks)**

Q6. The image below shows a metal frying pan



Identify a non-ferrous metal that is used in the manufacture of the frying pan.

Justify your answer. **(2 marks)**

Q7. Explain three distinct mechanical properties of copper that render it appropriate for usage as electrical wire. **(6 marks)**

Answers

Q1. B

Q2. C

Q3. A

Q4. B

Q5.

Possible materials may include:

Metals:

- Mild steel (1) as it has a high tensile strength so will withstand the load, without failing (1).
- Any other suitable response, e.g. stainless steel
-

Q6.

Possible responses may include:

- Aluminium (1). Resistant to corrosion so it will not rust when it is being washed/used repeatedly (1).
- Good fast heat distribution which allows the food to be cooked efficiently (1).
- Any other valid suggestion Other non-ferrous materials that are acceptable include copper with appropriate level of justification.

Q7.

- Enough durability (1) to withstand breaking (1)
- Flexibility (1) allows the wire to flex without snapping (1)
- Ductility (1) to enable wire drawing (1)
- Fatigue strength (1), which enables repeated bends without fracture (1)
- Being soft (1) makes it simple to cut (1)
- Creep resistant (1), preventing deformation from repeated pressures (1)