

# Design & Technology

# Casting

## Materials required for questions

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- Pencil
- Rubber
- Calculator

## Instructions

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- Use black ink or ball-point pen
- Try to 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

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- Marks for each question are in brackets
- Read each question fully
- Don't spend too much time on one question

# Good luck!

**Q1.** What process would have been used to make the metal frame of the g-clamp?

- A**      Casting
- B**      Injection moulding
- C**      Blow moulding

**Q2.** Which of the following methods can create large sized products?

- A**      Sand casting
- B**      Die casting
- C**      Resin casting

**Q3.** Which of the following is most suitable for large scale manufacture?

- A**      Investment casting
- B**      Sand casting
- C**      Die casting

**Q4.** Which of the following is true about resin casting?

- A**      Expensive
- B**      Toxic fumes can be released
- C**      Slow setting time

**Q5.** Which of the following is false about sand casting?

- A** Inexpensive
- B** Good surface finish
- C** Labour intensive

**Q6.** Which method will have the mould destroyed during casting process?

- A** Die-casting
- B** Resin casting
- C** Investment casting

**Q7.** Which casting method is typically used to make model cars?

- A** Investment casting
- B** Die casting
- C** Sand casting

**Q8.** Give **two** benefits of using die casting process to make products **(2 marks)**

1.

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2.

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**Q9.** Name a process that could be carried out in a school workshop to produce toys using aluminium **(1 mark)**

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**Q10.** Outline how a mould is prepared for sand casting **(6 marks)**

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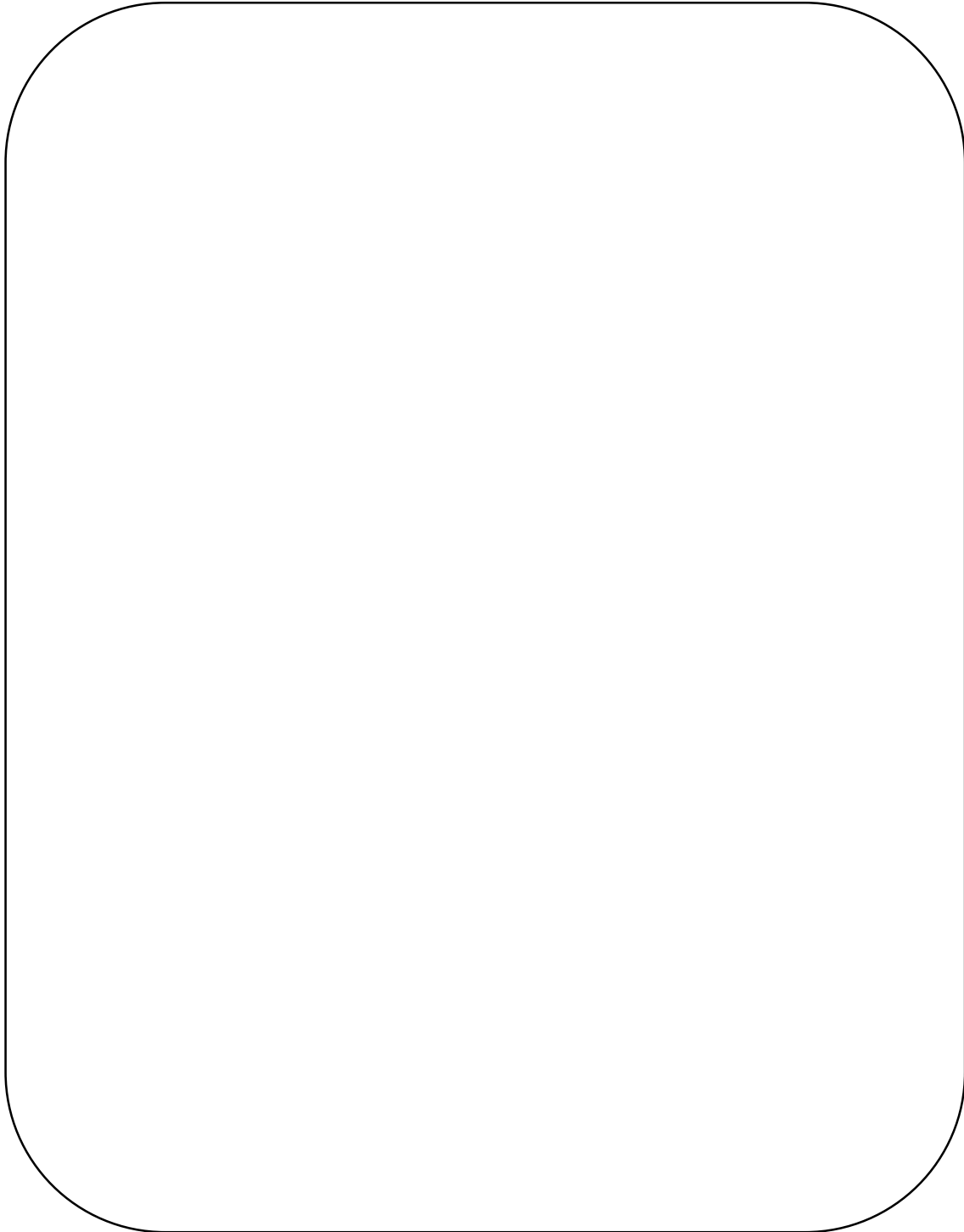
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**Q11.** Describe, using labelled sketches, the process of die-casting (**4 marks**)

A large, empty rounded rectangular box with a black border, intended for a student to draw a labelled sketch of the die-casting process. The box is centered on the page and occupies most of the lower half of the document.

**Q12.** Explain **two** advantages of using die-casting over sand casting to manufacture the body of toy cars **(6 marks)**

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## Answers

Q1. A

Q2. A

Q3. C

Q4. B

Q5. B

Q6. C

Q7. B

Q8.

Any **two** from:

- Intricate designs possible (1)
- Reusable moulds (1)
- Little or no machining necessary (1)
- Fast process (1)
- Identical multiple parts (1)
- Mass production possible (1)

Q9.

- [Sand] casting (1)

Q10.

An outline covering **six** of the following:

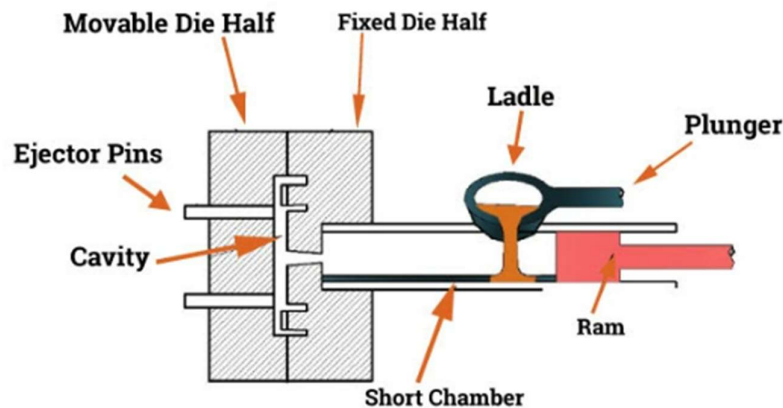
- Parting powder / French chalk is sprinkled over the pattern (1)
- Sand is then packed around the first half of the pattern in the drag (1)
- The drag is turned over and the cope is placed on top (1)
- The second half of the pattern and the sprue pins are then positioned (1)
- The cope is then filled with sand (1)
- The mould is separated and the pattern and the sprue pins are removed (1)
- Gates and channels are cut (1)
- The cope and drag are then reassembled in readiness for casting (1)

Maximum **five** marks if the stages are not in the correct order

**Q11.**

Labelled sketches referring to any **four** of the following:

- Die sprayed (1)
- Molten metal shot into closed die (1)
- Die/casting cooled (1)
- Die is opened / casting removed (1)
- Reference in graphic or label form to die being opened/closed/split (1)



If no sketch, or a sketch without labels, award a maximum of **three** marks

**Q12.**

Any **two** of the following explanations that include identification of an advantage (1) and linked justifications of that advantage (1) + (1):

- Using a permanent die is quicker than preparing a sand mould for each casting (1), which increases throughput / produce more in a given time (1) and means keeping up with high volume / commercial demand (1)
- The surface quality of the cast item is much better than sand casting (1), therefore no additional surface finishing / secondary processing such as milling / grinding is required (1) to produce toy cars suitable for being handled / played with / to get a commercial quality finish (1)



- Die casting can create finer details / thinner sections (1) as a sand mould may collapse (1) when trying to cast a small-scale product like the toy car (1)