**Design & Technology**

**Casting**

**Materials required for questions**

* Pencil
* Rubber
* Calculator

**Instructions**

* 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**

* 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.

2.

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

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

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

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

**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)

Diagram of a metal press

Description automatically generated

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)