## DTBase<sup>©</sup>

### Design & Technology AQA A-Level

# Rapid prototyping processes

#### 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 primary purpose of rapid prototyping in product development?

- A To create physical models quickly for testing and iteration
- **B** To replace all traditional manufacturing methods
- **C** To reduce the need for digital design files

**Q2.** Which material is commonly used in Fused Deposition Modelling (FDM) 3D printing?

- A Liquid resin
- **B** Metal powder
- **C** Thermoplastic filaments

Q3. What key advantage does 3D printing offer designers?

- A Limited design complexity due to layer-based printing
- **B** Ability to create intricate geometries impossible with traditional methods
- **C** Higher production speed for mass manufacturing

Q4. How does rapid prototyping benefit manufacturers?

- A Eliminates the need for quality control
- **B** Reduces material waste compared to subtractive methods
- **C** Guarantees zero post-processing requirements

**Q5.** Explain how rapid prototyping has impacted on traditional manufacture **(9 marks)** 

\_\_\_\_\_



#### Answers

- **Q1**. A
- **Q2**. C
- **Q3**. B
- **Q4**. B

Q5.

- Rapid prototyping has allowed companies the ability to develop and produce fully functioning prototypes without a huge financial investment in the manufacture of moulds or ancillary components.
- It has allowed for the design and manufacture of complex components that would have been prohibitive to manufacture traditionally.
- Rapid prototyping has removed the need for highly skilled manufacturers and tool makers as complex designs can be easily achieved without tooling.
- Traditional labour intensive manufacturing processes have been replaced by 3D printing that can run without supervision for extended periods of time without breaks or loss of concentration.
- A change in focus of manufacturers primary ability to work with physical materials to being competent to work in the field of CAD/CAM.
- A huge reduction in the lead time taken to design, produce, develop and test a physical product.
- The ability of a manufacturer to now perform many different techniques without the need to subcontract individual component parts out to specialist manufacturers.
- A reduction in the need for large industrial spaces and the investment in materials and machinery.
- The ability to create components from an ever-developing catalogue of material substrates.
- Rapid prototyping can be undertaken using a variety of substrates or materials.
- The move away from manufacturers designing components around stock forms and sizes of material.