DTBase©

Design & Technology
Eduqas GCSE

Developing ideas

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 these is a disadvantage of sketching?

A It is slow to produce

B It can lack detail or accuracy

C It is hard to share with others

Q2. Which of these is a digital model?

A A CAD model

B A card model

C A foam model

Q3. Which is a disadvantage of modelling?

A It cannot test ergonomics

B It cannot be changed

C It may not reflect the final materials or appearance

Q4. Which of these is a way of testing an idea or model?

A Writing a design brief

B Letting the user try the model in a user trial

C Choosing a context

Q5. What is the correct order of the iterative cycle?

A Design, model, test, evaluate, improve

B Test, design, improve, model, evaluate

C Evaluate, improve, design, test, model

Q6. A card model of a phone stand tips over when tapped. What is a sensible refinement?

A Make the base narrower

B Ignore it and make the final product

C Widen the base

Q7. An adjustable desk lamp is being designed. Give two items of information that could be obtained by designing a computer-generated (CAD) model of the adjustable lamp. **(2 marks)**

Q8. Explain why designers create models of their designs before final manufacture. **(3 marks)**

Q9. Designers often use iterative models when designing new products.

Q9a. Explain three reasons why designers use iterative modelling during the design process. **(6 marks)**

Q9b. A cutlery tray fits into a drawer and separates cutlery and kitchen utensils. It is made from 2 mm thick polypropylene and has seven compartments. Describe the materials or techniques you could use in a school workshop to make two different early iterative models of the cutlery tray. Include details of any tools or processes and the methods you would use. **(6 marks)**

Q10. During the development of a new smart watch with an activity tracker, designers used CAD to produce iterations of ideas. Describe in detail the benefits of using CAD to develop the new smart watch. **(4 marks)**

Q11. A pair of sunglasses has photochromic lenses that darken in sunlight, a folding frame with hinges, and a storage case. Describe two methods of testing that could be used to assess the function of the sunglasses. **(4 marks)**

Q12. A hardwood desk organiser has been designed and made. Describe one method, other than the use of a questionnaire, by which an evaluation of the success of the design could be carried out. **(2 marks)**

Answers

Q1. B
Q2. A
Q3. C
Q4. B
Q5. A
Q6. C

Q7.

Any two valid items of information (1 mark each), e.g. suitable sizes; proportions; appearance; being able to try out adjustments to parts of the lamp on screen. Only accept one reference to dimensions.

Q8.

Marks	Descriptor
3	A thorough explanation of why designers create models, with excellent understanding of their purpose.
2	Some explanation, showing good understanding of the purpose of models.
1	A limited explanation, showing basic understanding of their purpose.
0	Nothing worthy of credit.

Indicative content:

- Identifying any issues before full production, which saves time and cost
- Quicker speed of manufacture
- Customers or the target market can look at a model and give feedback
- You have something to hold and test, e.g. how well it functions, fits or feels

Q9a.

For each of three reasons: 1 mark for a suitable reason and 1 mark for explaining how modelling is used (or the type of model). For example:

- To test functionality, i.e. whether it works or a mechanism works (1), using working models (1)

- To test size (1) using block models or calico models (1)
- To see if it is easy to use or test ergonomics (1) with users (1)
- To check what it looks like and test aesthetics (1), exploring form, proportion and shape (1)
- To get user feedback (1) and find ways to improve the design or identify weaknesses (1)
- To test materials (1) and how suitable they are (1)
- To explore possible manufacturing methods (1) and construction techniques, to work out the best way to make it (1)

Q9b.

Up to 6 marks:

- Two modelling methods identified (up to 2 marks)
- Specific modelling materials identified (up to 2 marks)
- Specific tools and equipment identified (up to 2 marks)

An early iterative model might test function, or be a block model that tests appearance, ergonomics, usability or size. A later model may use workshop processes and similar materials to make a first prototype. Answers should cover wasting methods used to cut the materials (with specific tools), methods of joining materials, and tools and digital technology.

Q10.

Up to 4 marks for the benefits of using CAD to model, test, analyse, develop and refine the smart watch. Do not credit repeated statements.

Marks	Descriptor
4	A highly detailed explanation, e.g. CAD is a quick and effective way to test and develop ideas. Ideas can be simulated and shared with others, the target market or the client, and changes made by editing the CAD designs. CAD designs can be used to make 3D models using CAM or 3D printing.
3	A detailed explanation, e.g. CAD is a quick and effective way to test and develop ideas; ideas can be simulated and shared with others, and changes made by editing the CAD designs.
2	A more detailed response, e.g. CAD is a quick and effective way to test and develop ideas, and ideas can be simulated and shared with others.
1	A simple response, e.g. it is easier to edit and change ideas using CAD.
0	No answer or no relevant information.

Q11.

Two tests: for each, 1 mark for how to test and 1 mark for why. Maximum of 1 mark per test if only the case is mentioned. For example:

- Make a model of the frame (1) to test comfort, ergonomics or size on a user (1)
- A 3D CAD model (1) so the design can be seen on screen to test appearance (1)
- A model with lenses (1) to test with a user and gain feedback (1)
- Test the lenses (1) for UV resistance or weather resistance (1)
- Test with light (1) to check the lenses darken (1)
- Test the folding hinge (1) to make sure it works and does not easily break (1)
- Test the fit of the sunglasses (1) in the case (1)
- Anthropometric testing (1) to check fit and comfort (1)
- User feedback on style (1) using sketches, CAD images or physical models (1)
- Destructive testing (1), e.g. dropping or pulling until they break (1)

Q12.

Any valid method (up to 2 marks), e.g. check it against the original specification; give the product to a third party to test it out; place the items to be stored in the desk organiser to check they fit and can be accessed.