DTBase©

Design & Technology
Eduqas GCSE

Communicating 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 type of drawing is used for manufacture and shows dimensions, scale, materials and tolerances?

A An annotated sketch

B A third angle orthographic working drawing

C A presentation board

Q2. What does an exploded diagram show?

A How the parts fit together, drawn separated but lined up

B The inside of a product cut in half

C The order of steps in a control program

Q3. A Gantt chart is an example of:

A A system diagram

B A presentation

C A schedule

Q4. A toile is a model used when designing:

A Electronic circuits

B Garments

C Packaging

Q5. Which technique uses calculations and graphs to predict performance and cost?

A Audio recording

B Flow diagram

C Mathematical modelling

Q6. Which of these is a disadvantage of system and schematic diagrams?

A You need to understand the standard symbols

B They are not useful for fault finding

C They cannot show electrical systems

Q7. Three dimensional (3D) drawings communicate information in different ways to two dimensional (2D) drawings. Describe two advantages 3D drawing has over 2D drawing. **(4 marks)**

Q8. Sketching is used by designers to communicate information. Describe one advantage and one disadvantage of freehand sketching over computer aided design (CAD) drawing. **(4 marks)**

Q9. Designers often add written notes to their sketches to make annotated sketches. Explain the advantages for a designer of using annotated sketches to communicate design ideas. **(4 marks)**

Q10. Exploded drawings show details of an object in a unique way. Explain where and why exploded drawings are used. Give examples in your answer. **(4 marks)**

Q11. This question is about working drawings.

Q11a. A brass shelf clamp bracket is made from a working drawing. The drawing shows the views of the bracket with dimension lines, a Ø8 mm hole marked with centre lines, and dashed lines where the hole passes below the surface. Choose two drawing details from the working drawing and describe their function. **(4 marks)**

Q11b. The designer of a construction kit product produced a working drawing. Describe the information the designer would include in the working drawing. **(4 marks)**

Q12. A light shade has been designed on a CAD (Computer Aided Design) system. Describe one reason why a CAD system has been used to design the light shade. **(2 marks)**

Q13. Explain two advantages of using audio and/or visual recordings when developing design ideas. **(4 marks)**

Q14. Designers communicate their design concepts to potential clients and stakeholders. Discuss the techniques that designers use to communicate design concepts. Use specific examples to support your answer. **(8 marks)**

Answers

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

Q7.

Up to 2 marks for each advantage: 1 mark for a correct advantage and a second mark where it is explained or extra detail is given. For example:

- 1 mark: you can see at least 3 sides of the object; the drawing is more realistic; it gives an artist's impression of the object
- 2 marks: 3D drawing gives a more realistic view of how the product might look in real life
- 2 marks: it helps the viewer imagine how the product might feel when held or used
- 2 marks: it can be used to create a perspective view, e.g. 1, 2 or 3 point perspective
- 2 marks: it can show how a product is assembled, e.g. exploded drawings, making flat pack furniture easier to put together as you can see how the parts relate to each other
- 2 marks: you can see at least 3 sides, giving detail of sizes and proportion

Q8.

Up to 2 marks for the advantage and up to 2 marks for the disadvantage: 2 marks for a detailed point clearly linked to CAD; 1 mark for a basic point with no reference to CAD.

Advantages

- Can be done with simple, cheap equipment (pencil and paper), whereas CAD needs more expensive software and hardware
- Can be done anywhere, whereas CAD needs software and a computer
- Quick and easy to add shade and tone for a realistic effect, without the computer power needed for a render

- A great way of recording new ideas quickly without a CAD package and computer
- You do not need to know how to use complex CAD software

Disadvantages

- Not as accurate; drawings may be unclear if you are not good at drawing, whereas CAD is more precise
- A paper drawing can be damaged, e.g. if it gets wet, whereas a CAD drawing is saved electronically
- Cannot be shared like CAD files, which several people around the world can access at once
- Cannot be sent directly to a machine for CAM
- Mistakes may mean the sketch has to be redrawn, whereas in CAD it is easy to edit or undo mistakes

Relevant advantages of CAD can be given as disadvantages of freehand sketching.

Q9. (4 marks)

Marks	Descriptor
4	An excellent response considering a range of relevant aspects, e.g. materials, finishes, construction or function, especially the main advantage of the extra clarification gained by adding notes. Allows discussion with yourself and others.
3	A good response that considers most aspects but leaves out some important issues.
2	Considers a single aspect in depth, but does not mention the wider uses of annotation.
1	A limited response that briefly describes what notes do but not why they are useful.
0	No response or nothing worthy of credit.

Annotations give a third party information that a sketch or drawing alone cannot. Expect references to:

- Materials: sketches alone do not show material choices; notes can share the advantages and disadvantages of different materials, costs, availability, stock forms and sizes
- Construction: detail on possible construction, fabrication and assembly for a prototype, scale model or commercial product

- Finishes: detail on suitable finishes to be applied (or not)
- The customer: comments and feedback on the customer's needs and wants can be added to make future design intentions clear
- The specification: the designer can revisit specification points and review how well the design meets them

Q10. (4 marks)

Marks	Descriptor
3 to 4	Excellent understanding of where and why exploded drawings are used, with example(s).
1 to 2	An understanding of where or why exploded drawings are used. A maximum of 2 marks for a good explanation with no examples.
0	No response or nothing worthy of credit.

Exploded drawings:

- Show how the parts of a product fit and are put together
- Show detail that cannot be shown when the product is drawn assembled, and more information about the product
- Show how a product works, and structural detail of joining methods
- Are less confusing for people who are not technically minded or cannot read hidden detail on orthographic drawings
- Can be used instead of written instructions in several languages

Examples of use:

- Assembly instructions for products with many parts, e.g. IKEA furniture, Lego kits
- Service manuals, e.g. car repair manuals, vacuum cleaner manuals
- Architectural drawings to show the way round, e.g. hospitals
- Products such as wind-up toys, pens and torches

Q11a.

1 mark for naming each feature and 1 mark for describing its use (2 × 2 marks). For example:

- Centre lines (1): where two centre lines cross shows the position of the hole in the bracket (1)

- Hole diameter (1): shows how big the hole is, for securing the product to a wall or surface (1)
- Hidden detail line (1): shows the hole below the surface (1)
- Dimension lines (1): show the sizes of the parts (1)

Q11b.

Full marks can be given for two pieces of information described clearly. 1 mark can be given for a definition of a working drawing: a technical document giving details of a design so that a third party could make it successfully.

Information found on a working drawing:

- Dimensions (mm)
- Parts and components (parts list), including materials
- Drawings of the product: 2D, 3D, scale
- 3D CAD models, files or CAM settings
- Sectional, exploded or orthographic drawings
- Drawings of internal features
- Reference to British Standards (BSI)
- A lay plan

Q12.

1 mark for a reason and 1 mark for describing it. For example:

- The software is accurate (1), so complex shapes can be created (1)
- Files can be edited easily (1), so the design can be changed or a new design created quickly (1)
- The file can be used to make identical parts (1), e.g. laser cut or machined on a CNC milling machine (1)
- Files can be emailed (1) to different locations (1)
- The image can be copied and resized quickly (1)

Q13.

Up to 2 marks for each advantage: 2 marks for a detailed explanation; 1 mark for a simple point. Sketching ideas is not a visual recording.

Audio recordings

- Interviewing possible clients or end users to find out their needs and wants
- Getting feedback on design ideas and prototypes before moving forward
- Keeping a record of a discussion to look back at later, as you might forget the details
- Evidence of ownership or intellectual property
- A very quick way of recording information, e.g. on a smartphone, or in a Teams or Zoom meeting

Visual recordings

- Recording a client or user group using a possible product, e.g. nursery children playing with a prototype toy
- Recording a 3D simulation of a product in CAD software
- Recording a prototype being tested to see how it performs, including destructive and non-destructive testing
- Showing how to take apart and put together products, e.g. clips on websites instead of an instruction manual
- A video can be slowed down to see how a product performs, e.g. new running shoes

Q14. (8 marks)

Marks	Descriptor
6 to 8	A well-developed line of reasoning which is clear and logically structured. A good understanding of the methods of presenting ideas to clients and stakeholders and how they are used in reality. Relevant and supported with examples.
3 to 5	A line of reasoning with some structure. Some understanding of the methods and how they are used in reality. Mostly relevant and supported by some examples.
1 to 2	Basic information, not well structured. Limited understanding of the methods, with limited examples.
0	No response or nothing worthy of credit.

As a guide, full marks will include two or three examples of methods of presenting ideas. Techniques could include:

- Sketches, presentation drawings and working drawings

- CAD models, so designs can be viewed in 3D and rendered to show colours and textures
- VR or AR, so designs can be shown in context and interacted with
- Physical models and prototypes (handmade, 3D printed or rapid prototypes), so retailers and stakeholders can test and use the product before buying
- Pitching or demonstrating ideas in person, or by video or short films
- Graphic boards showing the product in a scenario or in use
- Meetings and focus groups
- PowerPoint presentations