Design & Technology
A-Level

Influence on design of anthropometrics an ergonomics
Multiple Choice

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
- Use a cross in the box to mark you 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. Ergonomics is the name given to the relationship between a product and its?

A Manufacture ☐

B User ☐

C Packaging ☐

Q2. Which word is used to describe designing products well so they are easy to use?

A Aesthetics ☐

B Usability ☐

C Function ☐

Q3. What is ergonomics?

A measurements of the human body ☐

B data of human height ☐

C The use of anthropometric data ☐

Q4. What percentiles should designers design products for?

A 5^{th} to 95^{th} percentile ☐

B 5^{th} to 50^{th} percentile ☐

C 50^{th} to 95^{th} percentile ☐

Q5. What might happen if ergonomics is not used in design?

A Users will have a poor user experience ☐

B users might take offence ☐

C users won't be able to adapt the user experience ☐

Q6. Which of these is NOT an inclusive design factor?

A function ☐

B cost ☐

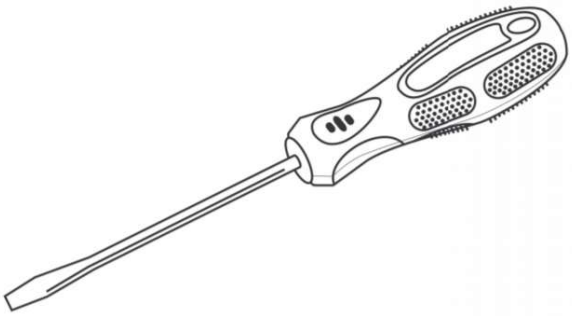
C material choice ☐

Q7. Study the data in the table below:

Part of body measured in millimetres	**Age of Child**		
	4 years	8 years	12 years
Height	1040	1270	1480
Arm length	420	545	650
Hand width	55	60	65

Analyse and evaluate how a designer would use the anthropometric data in the table to design playground equipment

Q8. The image below shows a screwdriver.

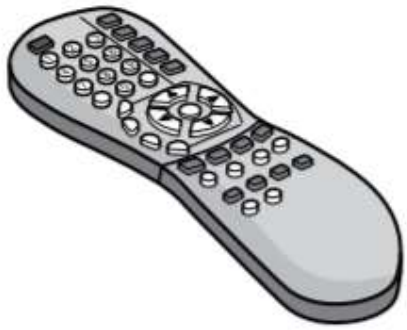


Explain why the screwdriver is successful in meeting the following specification points:

8ai. Be safe to use. **(2 marks)**

8aii. Be easy to grip. **(2 marks)**

Q9. Figure below shows a remote control.



Give 3 ergonomic features in the design of the remote control **(3 marks)**

1. _____

_____

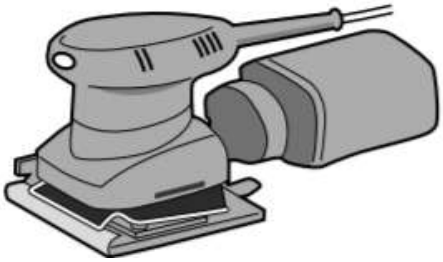
2. _____

_____

3. _____

_____

Q10. The figure below shows a palm sander to be used on wood



Describe 2 ways by which the designer has considered ergonomics in the design of the palm sander **(2 marks)**

1. _____

_____

2.

Q11. The figure below shows a coat rack for use in a primary school

Before it was made, a detailed design specification was written for the coat rack. Explain how the finished product has achieved the following specification points. (One example has been given). **(3 marks)**

Processes

The coat rack should be designed to be sold in flatpack form:
Temporary fixings such as bolts and screws have been used to hold the coat rack together so it can be assembled and disassembled easily

Aesthetic

The coat rack should be suitable for a primary school environment:

Function

The coat rack should be portable and suitable for use by children of primary school age (7-11 years old):

Safety considerations

The coat rack must be stable when heavily loaded with coats and bags:

Answers

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

Q7.

3 Responses may consider both positive and negative points – both equally valid.

Indicative content:

- Designer would ensure that the equipment is designed to an appropriate size for the intended user e.g. hands 55 to 65 mm wide
- Designer would identify the smallest and largest dimensions of the intended user group e.g. 1040 to 1480 mm tall
- Designer would make use of dimensions of the human body (child) to ensure construction and features are the correct size e.g. step spacing, height of arch ways and width of slide
- Additional evaluative points worthy of credit:
- Designed to accommodate a majority of children e.g. 90% of the percentile range
- May not cater for all possible users e,g. top and bottom 5%
- Use of anthropometric data helps with the design of ergonomic features in the play equipment

Accept all other valid responses

Q8ai.

One reason explained from:

- The handle is an insulator (1) and will therefore not conduct electricity (1)
- The handle / grip has been shaped / formed / styled / has texture / ergonomically designed (1) so it will not slip / twist in hand (1)
- Rounded handle (1) so fits into palm of hand (1)

(Do not accept anything related to being cut by the blade / sharp edge on blade)
Do not accept repeat of the stem 'easy to use'
2 x 1

Q8aii.

One reason explained from:

- The handle is ergonomically shaped (1) which fits nicely / comfortably in the hand (1)
- The handle is textured / rubber dimples (1) which means it will not slip (1)

Do not accept repeat of the stem 'be easy to grip'
2 x 1

Q9.

Award 1 mark for each ergonomic feature up to a maximum of 3:

- buttons easy to see
- comfortable or rounded shape in hand
- appropriate size to fit hand
- colour-coded buttons for ease of operation
- rubber buttons for better selection.

[3 × 1 mark]

Q10.

- Shape of sander fits into hand comfortably
- quick replacement of abrasive paper
- dust collection for health and safety
- appropriate size to handle

(2 × 1)

Q11.

Aesthetic:

Appropriate explanation but lacking detail AWARD 1 mark
E.g. Finished in primary colours.
Appropriate explanation well detailed AWARD 2 marks
E.g. Finished in primary colours which create a bright, cheery school environment.
Answers related to:
Textures are smooth

Function:
Appropriate explanation but lacking detail. AWARD 1 mark
E.g. The coat rack is a suitable size for primary school children.
Appropriate explanation well detailed. AWARD 2 marks
E.g. Anthropometric data has been used to ensure that the coat rack is a suitable size for primary school children.
Answers related to:
There are castors on the coat rack so it can be moved. Colour coated hooks help children to remember location of coats/bags.

Safety considerations:
Appropriate explanation but lacking detail AWARD 1 mark
E.g. The coat rack has a wide base.
Appropriate explanation well detailed AWARD 2 marks
E.g. The wide base of coat rack improves its balance so it will not topple over easily.
Answers related to:
No sharp edges. Steel is a durable material so it can hold lots of bags and coats. Sturdy construction of coat rack. Locks on castors – rack can be held in place, lessen danger of falling over if pushed