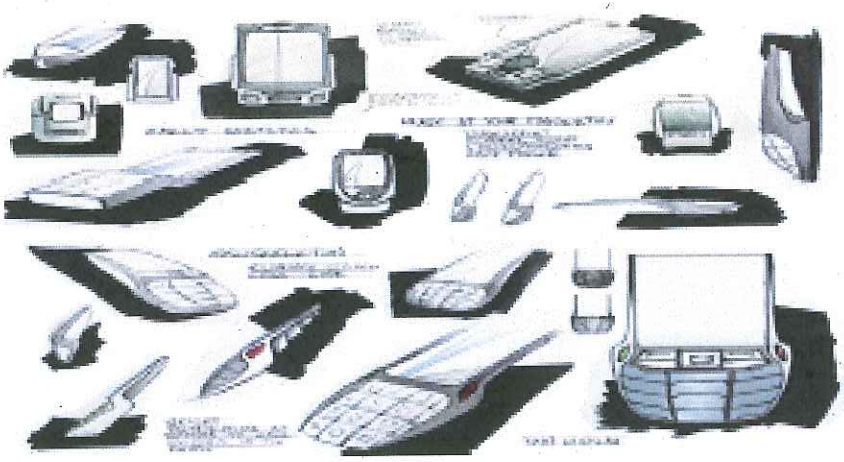
LESMAHAGOW HIGH SCHOOL

NATIONAL 4/5 HOMEWORK

DESIGN AND MANUFACTURE

DESIGN

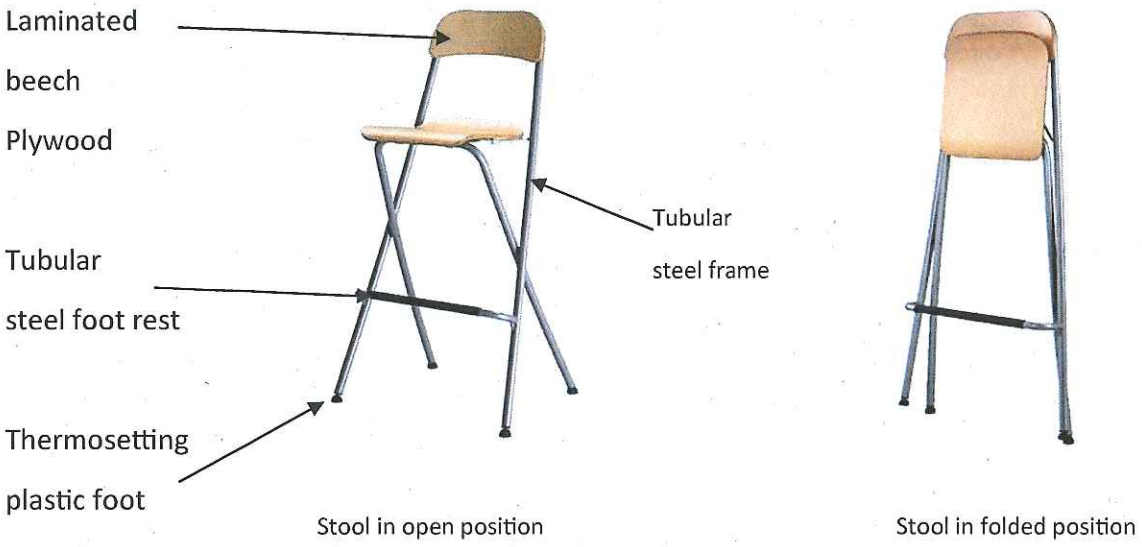


Pupils should use Homework jotter to answer questions .

Pupils should ensure they read the question and observe the marks available, prior to answering questions i.e 4 marks at least 4 points noted.

Pupils must ensure they number questions properly.

1. A folding kitchen stool is shown below.



a) (i) State **two** reasons why tubular steel is a suitable material for the frame of the stool. 2

(ii) State a suitable manufacturing process for the thermosetting plastic feet **and** state a reason why this process is suitable. 2

(iii) State **two** reasons why laminated beech plywood is a suitable material for the seat and back of the stool. 2

(iv) State a suitable method of permanently joining the steel foot rest to the frame **and** state a reason why this joining method is appropriate. 2

(*b*) Describe **two** ways in which the design of the stool has been influenced by each of the following ergonomic aspects:

(i) anthropometrics; 2

(ii) physiology; 2

(iii) psychology. 2

(*c*) State **two** reasons why each of the following is important in the design of the stool:

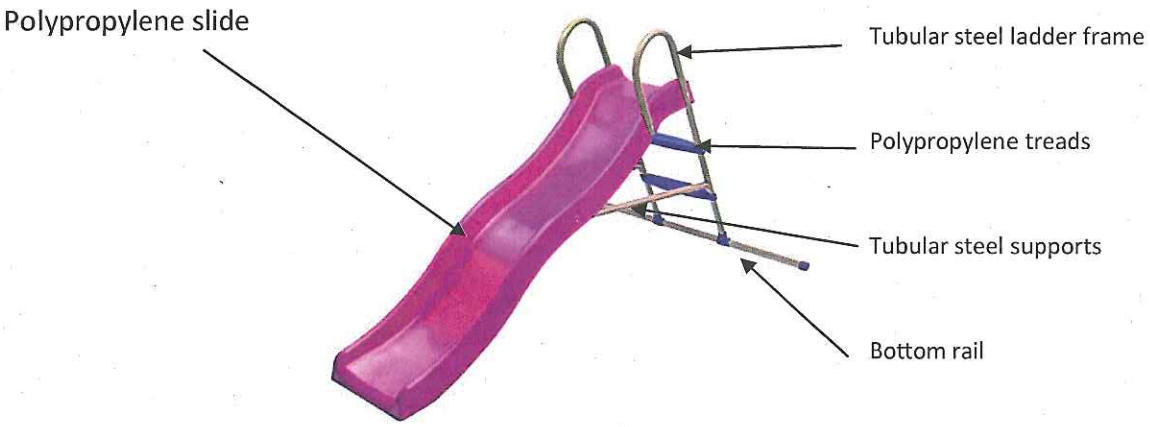
(i) surface finishes; 2

(ii) safety; 2

(iii) economics. 2

(20)

2. A child's activity toy is shown below.



(*a*) (i) State **two** reasons why polypropylene is a suitable material for the slide. 2

(ii) State **two** reasons why steel tube is a suitable material for the frame of the ladder. 2

(iii) State a suitable finish for the frame of the ladder and state a reason why this finish is appropriate. 2

(iv) State a suitable method of fixing the tubular steel supports to the polypropylene slide and state a reason why this fixing method is appropriate. 2

(*b*) Describe **two** ways in which the design of the activity toy shown above has been influenced by each of the following ergonomic aspects:

(i) anthropometrics; 2

(ii) physiology; 2

(iii) psychology. 2

(*c*) Describe **two** ways in which the design of the activity toy shown above has been influenced by each of the following design issues:

(*Note: different descriptions should be given for each design issue*.)

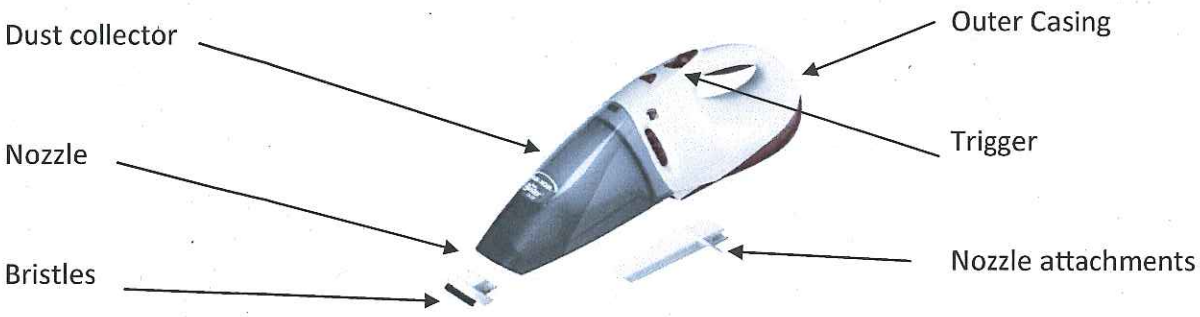
(i) safety; 2

(ii) durability; 2

(iii) contrast. 2

(20)

3. A cordless vacuum cleaner is shown below.



(*a*) (i) State a suitable manufacturing process for the outer casing and justify your answer. 2 2

(ii) State **two** reasons why the designer may have produced models when designing this cordless vacuum cleaner. 2

(*Note: different reasons should be given in your answers for (a)(iii) and (a)(iv).*)

(iii) State **two** reasons why polypropylene is a suitable material for the manufacture of the outer casing. 2

(iv) State **two** reasons why nylon is a suitable material for the bristles.

(*b*) Describe **two** ways in which the design of the cordless vacuum cleaner shown above has been influenced by each of the following ergonomic aspects:

(i) anthropometrics; 2

(ii) physiology; 2

(iii) psychology. 2

(*c*) Describe **two** ways in which the design of the cordless vacuum cleaner shown above could have been influenced by each of the following design issues:

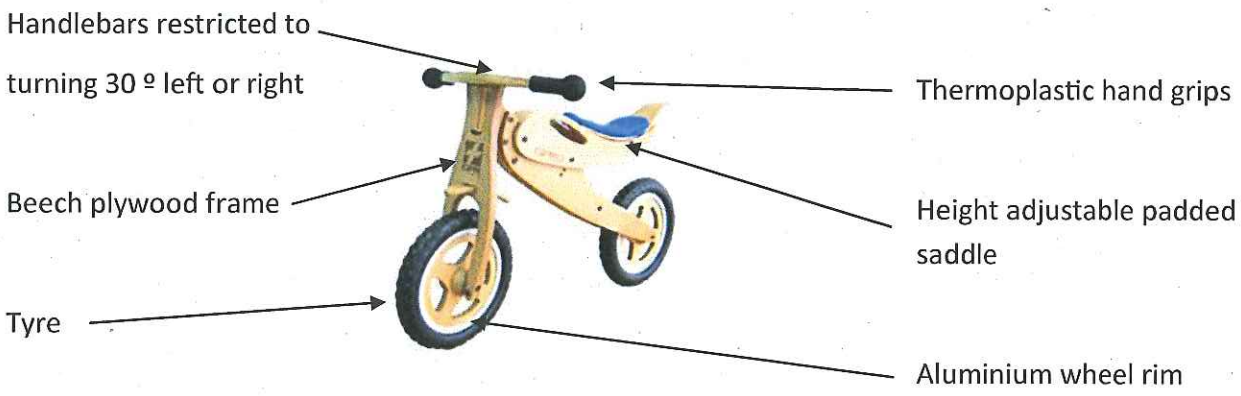
(i) contrast; 2

(ii) consumer demand; 2

(iii) ease of maintenance. 2

(20)

4. A mass produced wooden training bicycle for a 2–4 year old child is shown below.



(*a*) (i) State a suitable material for the tyres and state a reason why this material is suitable. 2

(ii) State **two** reasons why beech plywood is a suitable material for the frame of the bicycle. 2

(iii) State a suitable process for manufacturing the plywood parts of the frame and state a reason why this process is suitable. 2

(iv) State a suitable clear finish for the frame and state a reason why a clear finish would be applied. 2

(*b*) Describe **two** ways in which the design of the training bicycle shown above has been influenced by each of the following ergonomic aspects:

(i) anthropometrics; 2

(ii) physiology; 2

(iii) psychology. 2

(*c*) Describe **two** ways in which the design of the training bicycle shown above has been influenced by each of the following design issues:

(i) function; 2

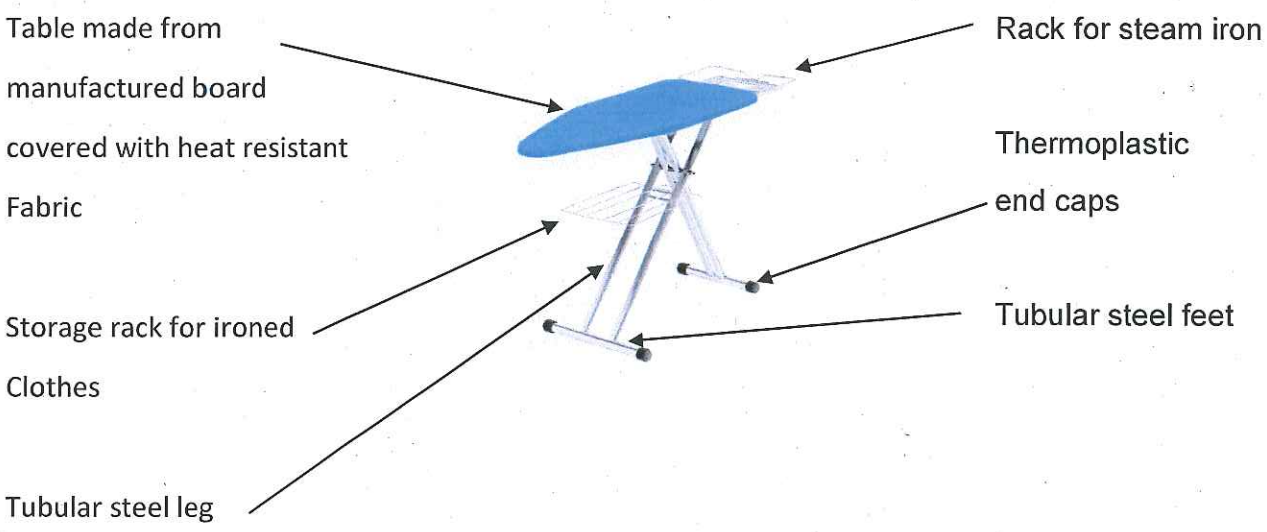
(ii) safety; 2

(iii) contrast. 2

(*Note: different descriptions should be given for each issue.*)

(20)

5. An ironing board is shown below.



(*a*) (i) State **two** reasons why tubular steel is a suitable material for the legs and feet of the ironing board. 2

(ii) State a suitable manufacturing process for the thermoplastic end caps **and** state a reason why this process is suitable. 2

(iii) State **two** reasons why manufactured board is a suitable material for the table of the ironing board. 2

(iv) State a suitable method of joining the legs to the feet **and** state a reason why this joining method is appropriate. 2

(*b*) Describe how the design of the ironing board has been influenced by each of the following ergonomic aspects:

(i) anthropometrics; 2

(ii) physiology; 2

(iii) psychology. 2

(*c*) Describe how the design of the ironing board has been influenced by each of the following design issues:

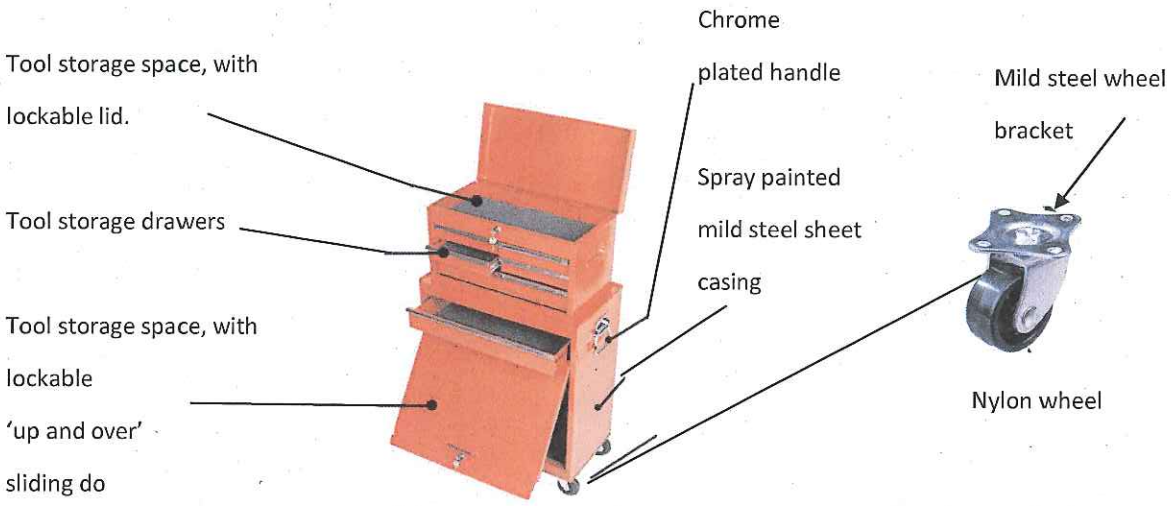
(i) function; 2

(ii) safety; 2

(iii) durability. 2

(20)

6. A portable tool chest is shown below.



(*a*) With reference to the items shown:

(i) state **two** reasons why mild steel sheet is a suitable material for the manufacture of the tool chest; 2

(ii) other than painting, state **two** suitable protective finishes for the mild steel casing of the tool chest; 2

(iii) state any suitable manufacturing process for the nylon wheel; 1

(iv) state **two** reasons why nylon is a suitable material for the wheel; 2

(v) state **any** process used in the manufacture of the mild steel wheel bracket. 1

(*b*) Describe how the design of the tool chest has been influenced by each of the following:

(i) anthropometrics; 2

(ii) physiology; 2

(iii) psychology. 2

(*c*) Describe how the design of the tool chest could have been influenced by each of the following issues:

(i) durability; 2

(ii) function; 2

(iii) safety. 2

(20)