

# **X211/11/01**

---

NATIONAL  
QUALIFICATIONS  
2012

THURSDAY, 24 MAY  
1.00 PM – 2.30 PM

PRODUCT DESIGN  
INTERMEDIATE 2

50 marks are allocated to this paper.

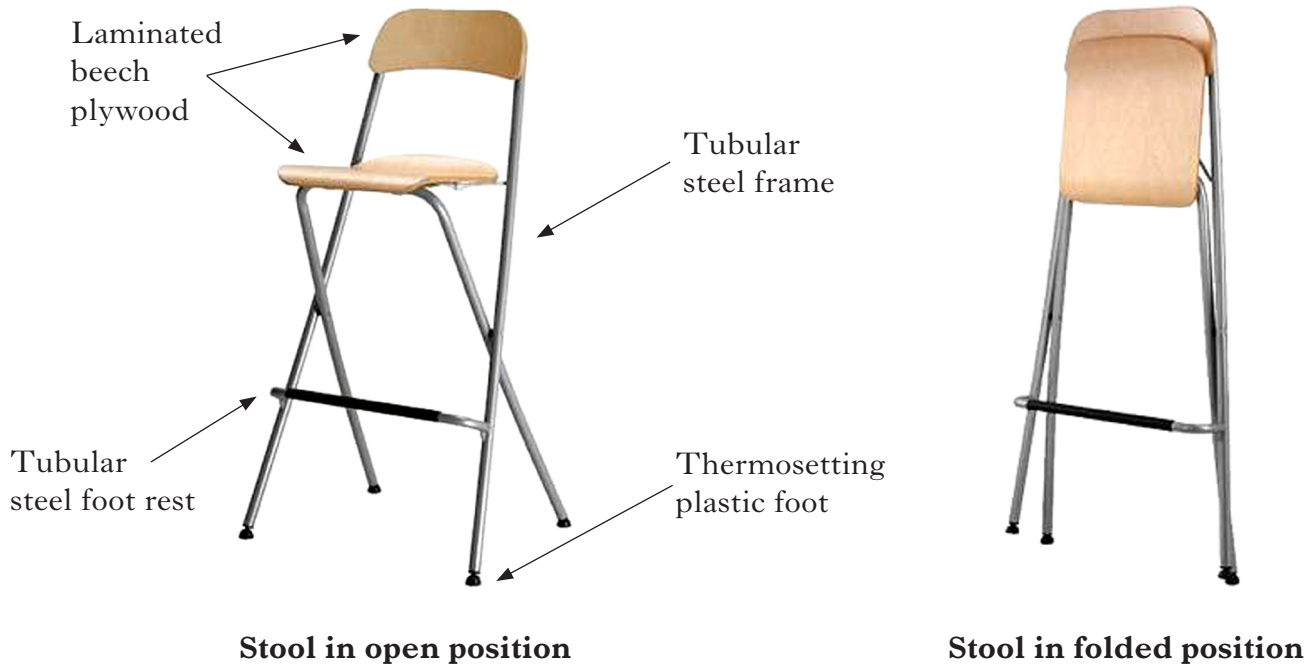
Where appropriate you may use sketches to illustrate your answer.

Within each question, marks will not be awarded for repetition.



SECTION A

1. A folding kitchen stool is shown below.



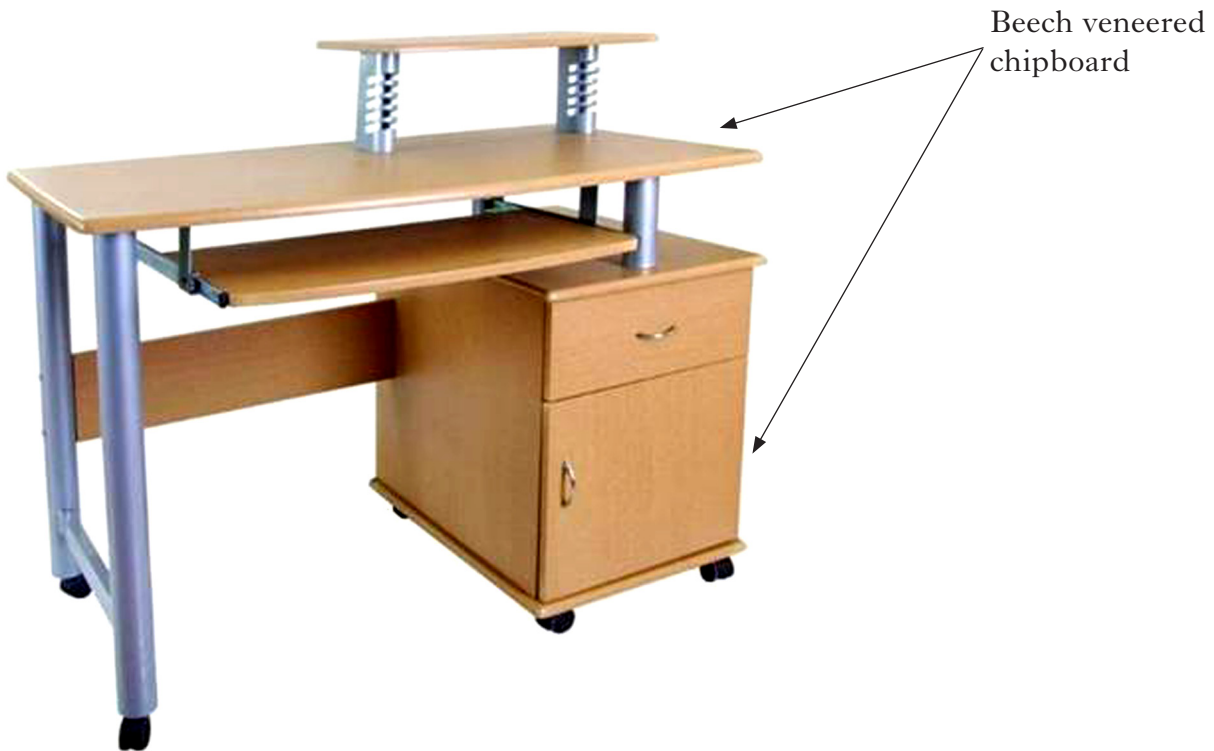
- (a) (i) State **two** reasons why tubular steel is a suitable material for the frame of the stool. 2
- (ii) State a suitable manufacturing process for the thermosetting plastic feet **and** state a reason why this process is suitable. 2
- (iii) State **two** reasons why laminated beech plywood is a 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

**Total for Section A (20)**

**SECTION B**

*Marks*

2. The computer desk shown below was supplied as a flat-pack.



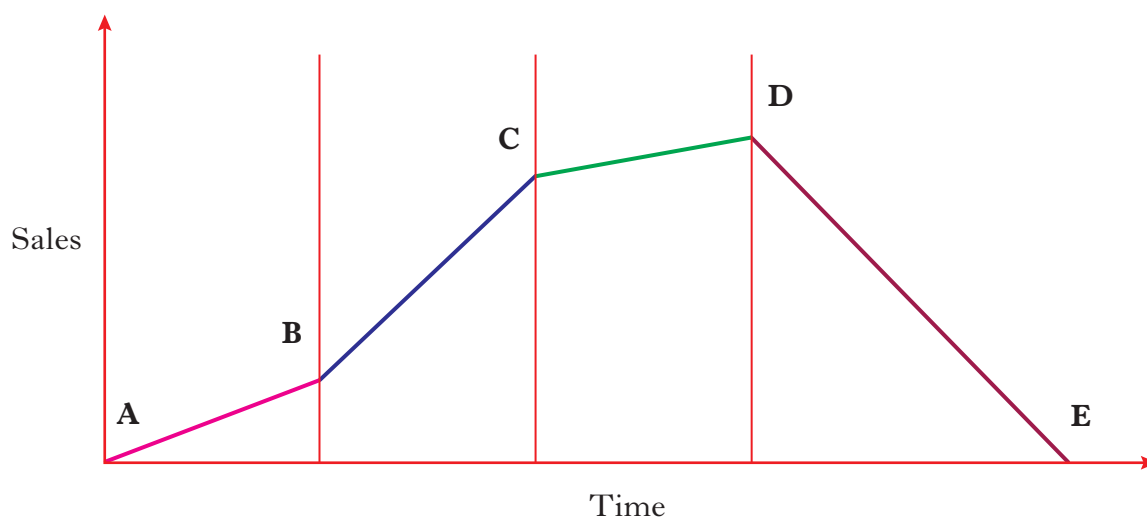
- (a) State **two advantages** to the **consumer** of flat-packed furniture. 2
- (b) State **two** advantages of using beech veneered chipboard for the computer desk rather than using solid beech. 2
- (c) Knock down fittings are often used in the construction of flat-packed furniture.  
Explain the term “knock down fittings”. 1

**(5)**

**[Turn over**

3. As products in the market place come and go, they are said to have a “product life cycle”.

A typical life cycle for a product is shown in the graph below.



- (a) (i) Explain **why** there is a large increase in sales between points B and C on the graph. 2
- (ii) Explain **why** sales have declined between points D and E on the graph. 2
- (b) Standard components are used in the manufacture of products such as microwave ovens and toasters. Explain the advantages of using “standard components”. 2
- (c) In recent years product packaging has been highlighted as an environmental concern by both manufacturers and consumers. Describe the environmental issues associated with product packaging. 2

**(8)**

4. Five products are shown below with a list of manufacturing processes.

Match each product or part of product with the most suitable manufacturing process from the list.

(5)



**A** Thermoplastic oil tank



**B** Pine table leg



**C** Metal parasol stand



**D** Thermoplastic rainwater guttering



**E** Metal muffin tray

**Manufacturing Processes**

- Soldering
- Rotational moulding
- Press-forming
- Extrusion
- Compression moulding
- Injection moulding
- Sand casting
- Laminating
- Turning

5. A hand held game is shown below.



The manufacturer wishes to carry out an evaluation of the hand held game.

Describe an evaluation technique that could be used for each of the following aspects of the hand held game:

*(Note: a different technique must be used for each aspect.)*

- |                   |            |
|-------------------|------------|
| (a) Ease of use;  | 2          |
| (b) Aesthetics;   | 2          |
| (c) Battery life. | 2          |
|                   | <b>(6)</b> |

6. A claw hammer is shown below.

**Head:** Forged alloy steel



**Shaft:** GRP (Glass Reinforced Plastic)

- (a) State **two** reasons why the designer has chosen forged alloy steel for the head of the claw hammer. 2
- (b) State **two** reasons why the designer has chosen GRP for the shaft of the claw hammer. 2
- (c) Describe the appeal of the claw hammer to the consumer. 2

**(6)**

[END OF QUESTION PAPER]

## ACKNOWLEDGEMENTS

Question 5—Photograph of a Nintendo hand-held game. Permission is being sought from Nintendo.

Question 6—Photograph of a “Roughneck” claw hammer. Reproduced by kind permission of Olympia Tools (UK) Ltd.