



**DESIGN TECHNOLOGY
 STANDARD LEVEL
 PAPER 3**

Wednesday 14 November 2001 (morning)

1 hour 15 minutes

Name

Number

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INSTRUCTIONS TO CANDIDATES

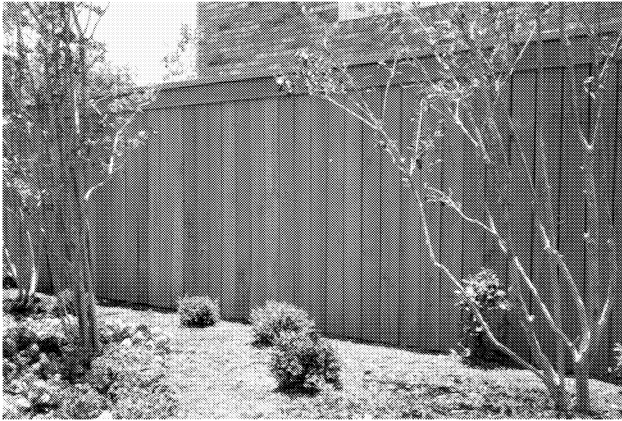
- Write your candidate name and number in the boxes above.
- Do not open this examination paper until instructed to do so.
- Answer all of the questions from three of the Options in the spaces provided. You may continue your answers in a continuation answer booklet, and indicate the number of booklets used in the box below. Write your name and candidate number on the front cover of the continuation answer booklets, and attach them to this question paper using the tag provided.
- At the end of the examination, indicate the letters of the Options answered in the boxes below.

OPTIONS ANSWERED		EXAMINER	TEAM LEADER	IBCA
		/15	/15	/15
		/15	/15	/15
		/15	/15	/15
NUMBER OF CONTINUATION BOOKLETS USED	TOTAL /45	TOTAL /45	TOTAL /45

Option A – Raw material to final product

The pictures show different types of fencing.

Picture A - Wooden Fence



Picture B - Wrought Iron Fence



Picture C - Mild Steel Fence with Plastic Finish



A1. (a) State **one** reason why the fence in picture 'C' is plastic coated. [1]

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(b) Outline **one** advantage of the wooden fence compared to the metal fence. [2]

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(c) Compare the fence in picture 'A' with the fence in picture 'B' in relation to durability. [3]

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A2. State **two** reasons why nylon is a popular material for tent fabric. [2]

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A3. A novel food product using microprotein is to be developed. Outline **three** aspects of the design specification with particular reference to mycoprotein. [3]

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A4. Explain **two** reasons why superconductors are currently of limited use. [4]

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Option B – Products in context

The table lists criteria which a consumer may use to evaluate a product.

EVALUATION CRITERIA

PHASE 1.	Before Purchase	Manufacturers' Specification Advertised Performance Appearance Test Results Image of Company List Price
PHASE 2.	Purchase	Overall Design and Quality Materials, Colour, Finish First Impressions of Performance Purchase Price
PHASE 3.	Initial Use	Actual Performance Ease of Use/Safety
PHASE 4.	Long-term Use	Reliability Ease of Maintenance Durability Running Costs

B1. (a) State which phase would be the most appropriate for providing the consumer with data using a literature search. [1]

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(b) Outline **one** advantage to the consumer of using test results in phase one. [2]

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(c) Explain why the various criteria in the table may not be of equal importance. [3]

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B2. State **two** environmental problems that may result from the increasing demand for energy in the manufacture of products. [2]

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B3. Outline **three** advantages for using solar power as the energy source for watches. [3]

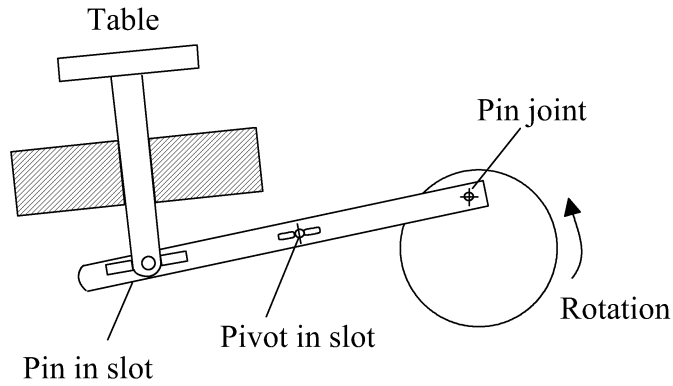
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B4. Discuss how the concept of recycling could affect the world's resources and reserves. [4]

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Option C – Mechatronics

The diagram shows a possible design concept for a mechanism used to raise and lower a table for rejecting items from a conveyor. The table is raised and returned with each revolution for the drive motor.



C1. (a) State the name of the mechanism represented in the diagram. [1]

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(b) State **two** criteria, other than mechanical efficiency, for evaluating the mechanism. [2]

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(c) Assess the effectiveness of the mechanism. [3]

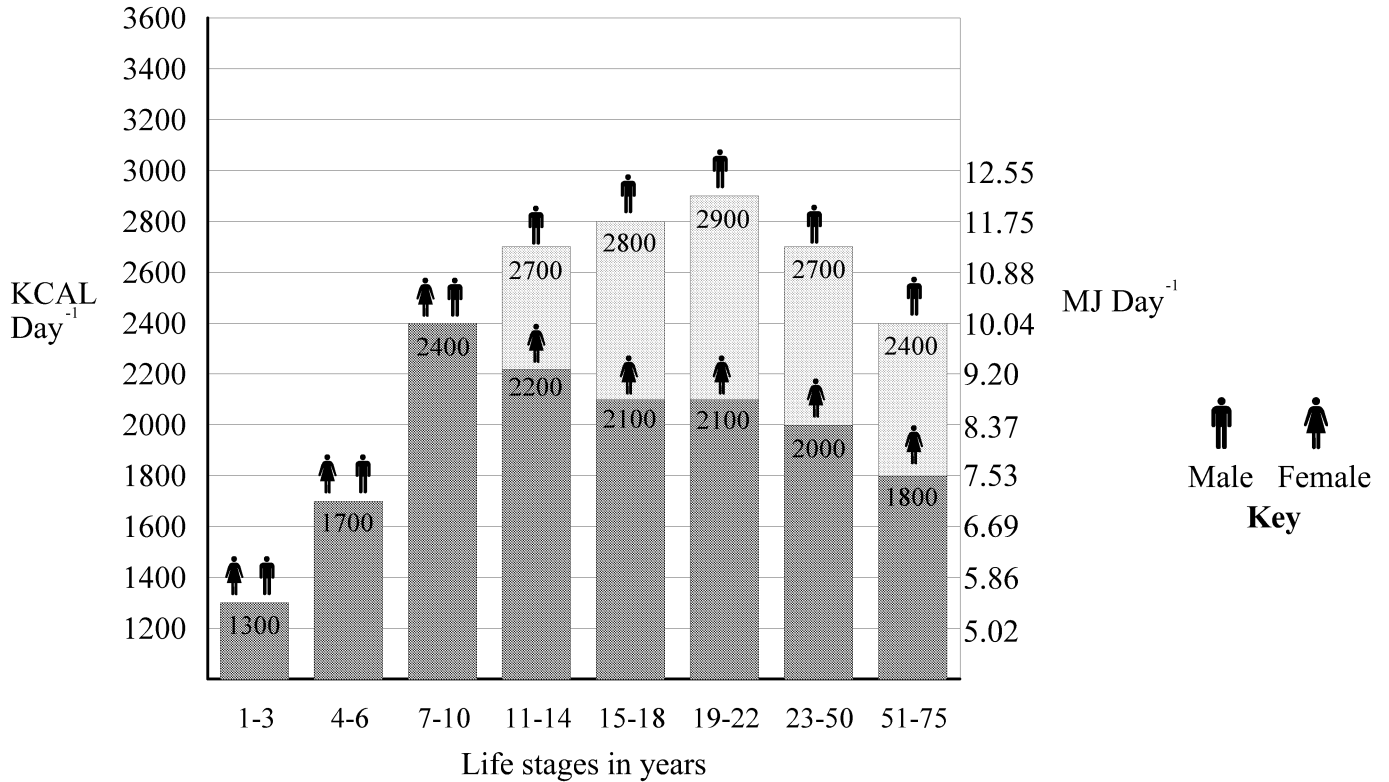
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C2. Define the moment of a force about a point. [1]

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Option D – Food technology

The bar chart shows the energy requirements for people at different stages of their life.



D1. (a) State the age span over which females have an energy requirement of 2100 Kcal per day. [1]

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(b) Describe the relationship between the energy requirements for males and females over the whole lifespan. [2]

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(c) Outline how nutritional requirements and food choice change as a person gets older. [3]

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D2. Describe how food irradiation affects the storage properties of fruit. [3]

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D3. Outline a lifestyle issue resulting from the increase in the popularity of cook-chill food products in many parts of the world. [2]

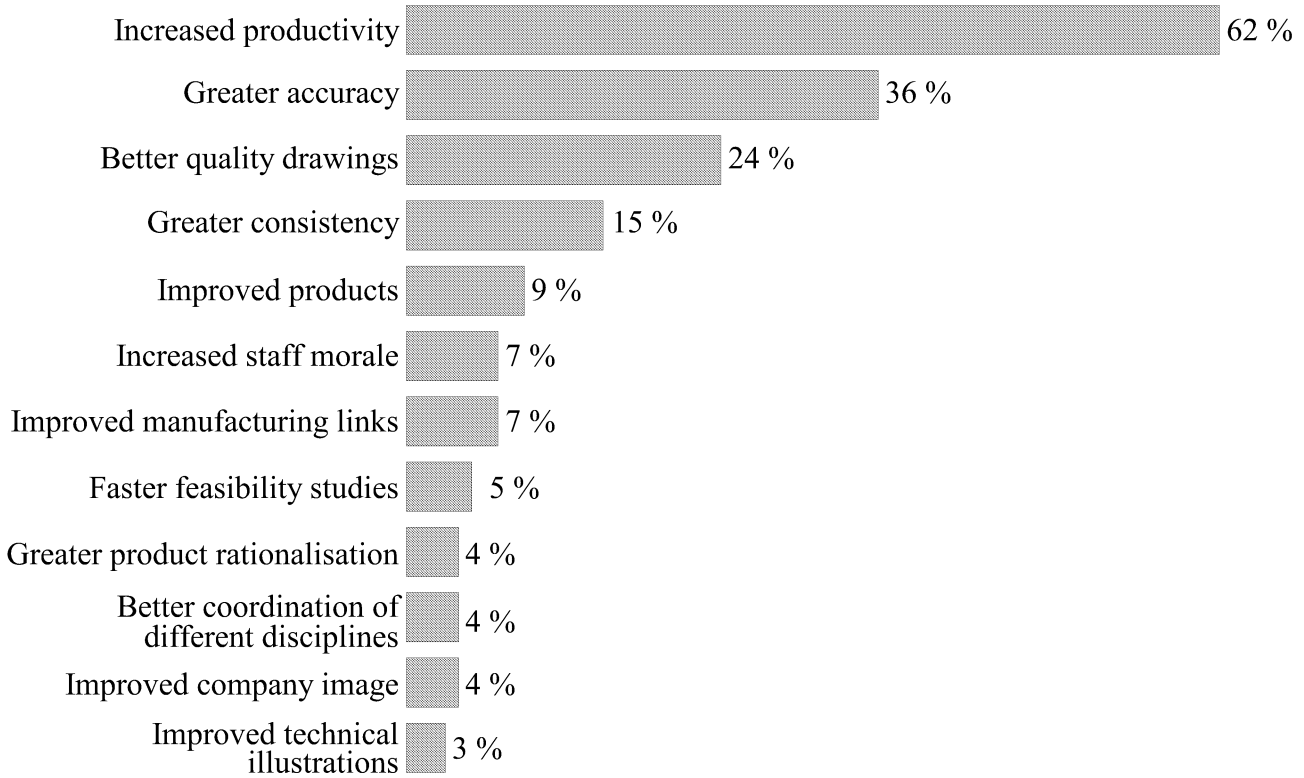
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D4. Explain why designers modify the organoleptic properties of potato crisps (chips) in order to target different market segments. [4]

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Option E – Computer aided design and manufacturing

The bar chart shows the results of a survey carried out in the 1980s of 74 companies across a variety of design professions asking what benefits the companies felt they had actually received from using CAD.



E1. (a) State **one** reason why increased productivity was considered the major benefit of using CAD. [1]

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(b) Identify **one** reason why the use of CAD increased staff morale. [2]

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(c) Explain the relationship between greater consistency and greater accuracy when using CAD. [3]

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Option F – Invention, innovation and design

The illustration shows a racing bicycle incorporating the latest technology in its design.



F1. (a) State **one** reason why the bicycle wheel shown can be classified as innovative compared to previous bicycle wheel designs. [1]

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(b) Outline **one** reason for the re-design of the handlebars. [2]

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(c) Explain **one** advantage of the use of new materials in the design of the bicycle in general. [3]

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F2. Outline an example of market pull in relation to the design of ovens. [2]

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Option G – Health by design

The table describes a range of different types of contact lenses available on the market.

Type	Description
Hard	The original lens – needs cleaning daily and is not suitable for all users.
Rigid Gas Permeable	Made from stiff plastic and gradually replacing hard lenses. More durable than soft lenses but takes time to get used to them.
Soft	Made from oxygen-permeable soft plastic. High comfort and compatibility rating.
Frequent Replacement	Soft disposables used for a week to a month depending on wear but must be cleaned each day.
Daily Disposable	Soft and used on a daily basis with no need for cleaning.
Extended Wear	Similar to frequent replacement but no need to take them out at night for cleaning.
Coloured	Coloured and patterned lenses to change eye appearance.

G1. (a) State the name of the lens used primarily for cosmetic purposes. [1]

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(b) Explain **one** reason why the earliest type of lens was hard. [2]

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(c) Outline **three** reasons why so many different lenses are available. [3]

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G2. State **two** disadvantages of the use of the conventional liquid-in-glass medical thermometer. [2]

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G3. Evaluate the benefits of the development of the disposable syringe to people with diabetes. *[3]*

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G4. Discuss the issues concerning elective cosmetic surgery for the medical profession. *[4]*

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