



DESIGN TECHNOLOGY
HIGHER LEVEL
PAPER 3

Thursday 15 November 2007 (morning)

1 hour 15 minutes

Candidate session number

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INSTRUCTIONS TO CANDIDATES

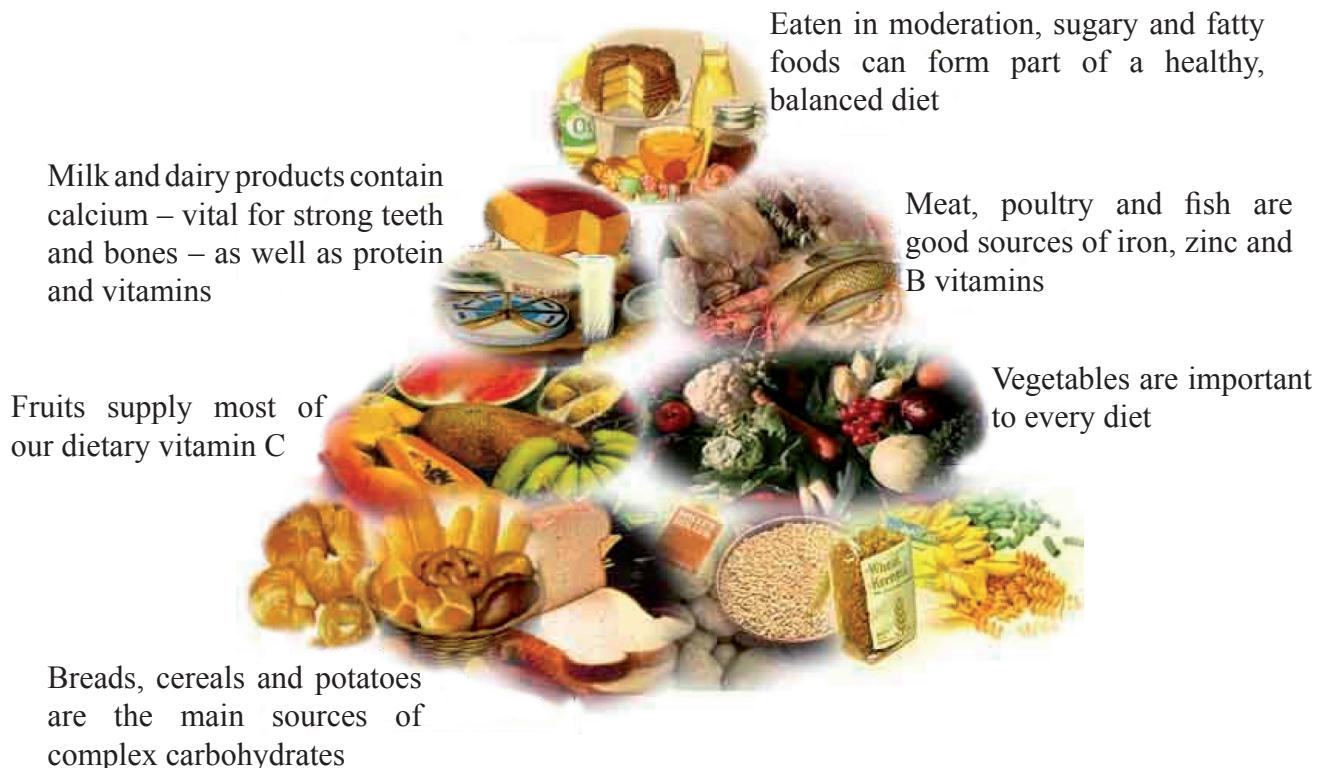
- Write your session number in the boxes above.
- Do not open this examination paper until instructed to do so.
- Answer all of the questions from two of the Options in the spaces provided. You may continue your answers on answer sheets. Write your session number on each answer sheet, and attach them to this examination paper and your cover sheet using the tag provided.
- At the end of the examination, indicate the letters of the Options answered in the candidate box on your cover sheet and indicate the number of answer sheets used in the appropriate box on your cover sheet.



Option D — Food technology

- D1. A food pyramid is a common way of representing the food groups required for a balanced diet. A typical example of a food pyramid is shown in **Figure D1**.

Figure D1: Food Pyramid



[Source: <http://www.bawarchi.com/health/images/pyramid.jpg>]

- (a) List **two** foods from the Food Pyramid in Figure D1 which contain macronutrients. [2]

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- (b) Explain why the food in Figure D1 is organized into the shape of a pyramid. [3]

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- D2.** Select a food from the Pyramid in Figure D1 that is high in fibre and state why fibre is essential for human health. [2]

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- D3.** Describe why apples turn brown when they are cut. [2]

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- D4.** Outline **one** way an understanding of genetics has helped more food to be produced. [2]

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- D5.** Explain **three** ways in which the careful design of food preparation areas can help to reduce possible bacterial contamination of food. [9]



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Option E — Computer-aided design, manufacture and production

- E1. CAD/CAM is used in the design stage as well as for manufacturing. The shapes in **Figure E1** and **Figure E2** have been developed using CAD software. The initial brief for the students was to explore shapes using CAD-CAM and then, from those shapes, develop possible applications for a specific product. After all the components were cut out using a computer-controlled machine, they were then assembled into a 3D model. This activity represented the generating ideas stage in the design cycle. The next stage in the design cycle is to develop a product based on the forms.

Figure E1

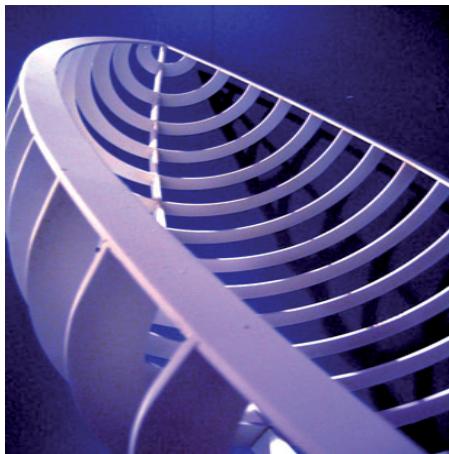
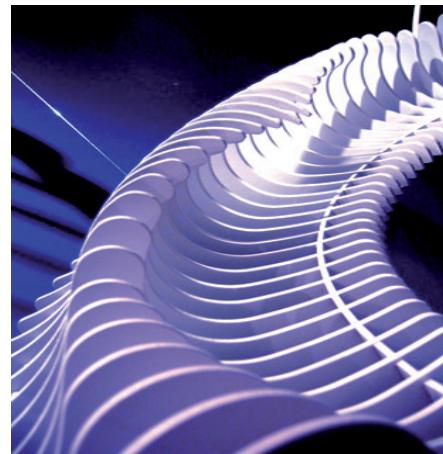


Figure E2



- (a) List **three** reasons why designers would choose CAD as a modelling technique to produce the shapes in Figures E1 and E2. [3]

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- (b) Outline why the shapes in Figures E1 and E2 are best produced by a CNC machine. [2]

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- E2.** Identify why the examples in Figures E1 and E2 are **not** a CIM system. [2]

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- E3.** Identify why production using craft techniques will remain a relevant production process in the future in some situations. [2]

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- E4.** Outline **one** advantage of using a satellite based telephone communication system. [2]

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E5. Discuss **three** strategies designers could employ to implement design for manufacture (DfM). [9]

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Option F — Invention, innovation and design

- F1.** Oscar Levi Strauss saw the need for tough trousers in the gold rush era of 1849 in California. To respond to the miners' complaints that the knees wore out of traditional trousers he used tent canvas. The fabric was ordered from Nimes in France (de Nimes, or denims). One miner complained that the pockets ripped off too easily when he stuffed his pockets with heavy tools. As a joke, Ike's trousers were taken to a blacksmith and the pockets put back on with rivets. The idea worked so well that Strauss soon put them on all the denim trousers which were called Levi® jeans.

Figure F1: Trousers made from denim



- (a) Describe **one** reason why denim jeans as shown in Figure F1 diffused into the market place. [2]

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- (b) Explain how market pull was the impetus for the development of Levi denim jeans (or trousers) as shown in Figure F1. [3]

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- F2.** Identify **two** examples of incremental design based on the original denim jeans as shown in Figure F1. [2]

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- F3.** Describe the “imitative” corporate strategy of other companies following Levi® jeans pioneering strategy. [2]

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- F4.** Describe **one** reason why Levi jeans is an example of robust design. [2]

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F5. Explain **three** reasons why market research is important in a global market.

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Option G — Health by design

- G1.** **Figure G1** is an extract from a web site that sells both prescription and non prescription contact lenses.

Figure G1: Contact lens information

Colour Blend Contact Lenses

These prescriptive soft cosmetic contact lenses can be worn for up to 30 days.

Please note each box contains two lenses of the same power, so if your eyes are different you will need to order a new box for each eye.

Pure Hazel Colour Blends True Sapphire Colour Blends Amethyst Colour Blends

NEW COLOUR!



NEW COLOUR JUST IN!!

£20.00

Prescription:

NEW COLOUR!



NEW COLOUR JUST IN!!

£20.00

Prescription:

NEW COLOUR!



NEW COLOUR JUST IN!!

£20.00

Prescription:

[Source: <http://www.eyechange.co.uk/acatalog/>]

- (a) Identify **one** advantage of a disposable contact lens as described in Figure G1. [2]

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- (b) Explain the influence of fashion as it relates to the contact lenses in Figure G1. [3]

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- G2.** Compare soft and hard contact lenses with respect to duration of wear. [2]

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- G3.** Outline why regulatory authorities approve materials for use in medical devices for specific rather than general application. [2]

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- G4.** Outline the importance of CAD/CAM in the production of low-cost contact lenses. [2]

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- G5.** Discuss **three** benefits of using each of the following: computers, digital electronic hearing aids and powered prostheses, as technological augmentation for disabled people. [9]

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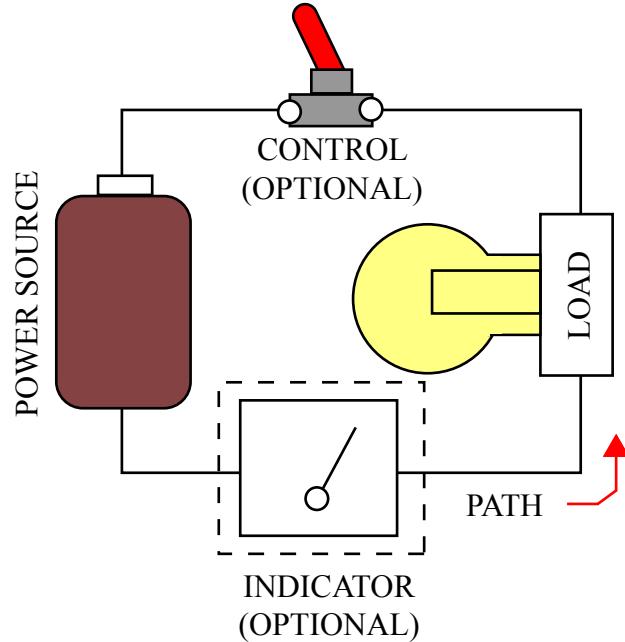
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Option H — Electronic products

H1. Figure H1 shows a very basic generic circuit.

Figure 1: A simple circuit



[Source: www.electronics-lab.com]

- (a) Draw the International Standard symbols for a normally closed switch and the battery power source. [2]
- (b) Construct a block diagram and identify the input, process and output components based in Figure H1. [3]

- H2.** Identify how electronic feedback could be used to control a heating system.

[2]

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- H3.** Describe the basic function of a semiconductor diode.

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- H4.** Compare the speed of communication using satellite and fibre optic communications between London and Australia.

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- H5.** Discuss **one** benefit to each of the user, manufacturer and marketer of using multiple application smart cards.

[9]

