IB DIPLOMA PROGRAMME
PROGRAMME DU DIPLÔME DU BI
PROGRAMA DEL DIPLOMA DEL BI

N03/470/S(2)

DESIGN TECHNOLOGY
STANDARD LEVEL
PAPER 2

Candidate number

Friday 7 November 2003 (afternoon)

1 hour

INSTRUCTIONS TO CANDIDATES

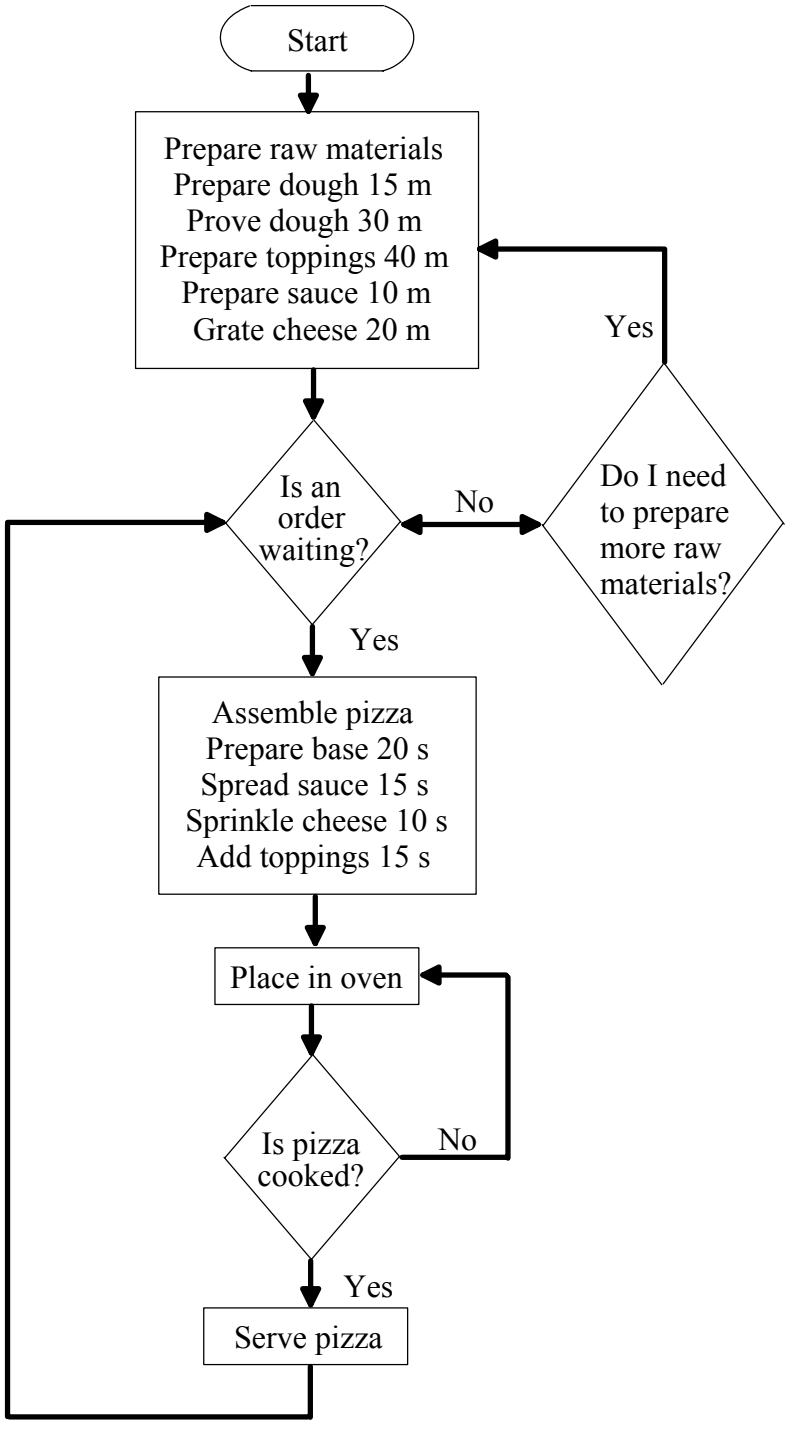
- Write your candidate number in the box above.
- Do not open this examination paper until instructed to do so.
- Section A: answer all of Section A in the spaces provided.
- Section B: answer one question from Section B. Write your answers on answer sheets. Write your candidate number on each answer sheet, and attach them to this examination paper and your cover sheet using the tag provided.
- At the end of the examination, indicate the numbers of the questions answered in the candidate box on your cover sheet and indicate the number of sheets used in the appropriate box on your cover sheet.

SECTION A

*Answer **all** the questions in the spaces provided.*

1. Figure 1 shows a flow chart for the production of pizzas. On arrival at the restaurant the chef starts the production process by preparing the raw materials. On receipt of an order the chef will assemble the pizza according to the customer's requirements and place the pizza in the oven. When the pizza is cooked it would be served.

Figure 1



(This question continues on the following page)

(Question 1 continued)

(a) (i) Calculate how long it takes to assemble one pizza. *[2]*

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(ii) Identify **one** stage of the production of the pizza that is an example of batch production. *[1]*

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(iii) Identify **one** stage of the production of the pizza that is an example of assembly line production. *[1]*

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(b) (i) Outline **one** aesthetic consideration that could be evaluated by the chef in the quality control of the pizza in the normal run of production. *[2]*

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(ii) Outline **one** aspect of the production process that will ensure standardised products. *[2]*

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(c) Explain how the chef would modify the production process to enable four pizzas to be cooked and served simultaneously. *[4]*

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2. (a) Define *clean technology*. *[1]*

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(b) Explain why an "end-of-pipe" approach cannot be considered a radical strategy in the redesign of a manufacturing process. *[3]*

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3. (a) Define *lamination*. *[1]*

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(b) Explain **one** reason why lamination is not suitable in an automated production system. *[3]*

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SECTION B

*Answer **one** question. Write your answers on the answer sheets provided. Write your candidate number on each answer sheet, and attach them to this examination paper and your cover sheet using the tag provided.*

4. Figure 2 shows three different packages for soft drinks: a metal can (figure 2), a glass bottle (figure 3) and a plastic bottle (figure 4). The metal can is manufactured by cutting and machining, the bottles are manufactured by moulding.

Figure 2

Figure 3

Figure 4

[Source: http://www.ribena.co.uk/html/about_ribena/]

(a) (i) List **two** properties of glass that make it suitable for application in drinks containers. *[2]*

(ii) Outline **one** reason why the metal can is most economic for distribution. *[2]*

(b) (i) Define *machining.* *[1]*

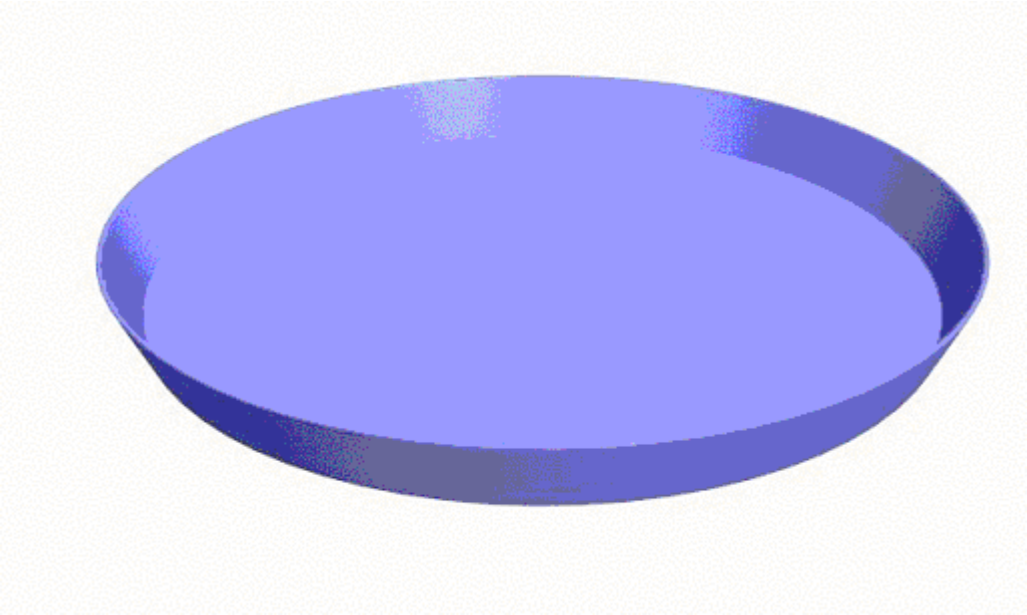
(ii) Identify **one** ergonomic benefit of using moulding for the manufacture of the glass and plastic bottles. *[2]*

(iii) Outline how *automated guided vehicles* (AGVs) contribute to the automated production of soft drinks. *[2]*

(c) Evaluate the green design considerations for the disposal of each of the drinks containers. *[11]*

5. Figure 5 shows an injection-moulded tray made from a thermoplastic. The tray has a short product life.

Figure 5



(a) (i) Outline **one** property of the thermoplastics that make it suitable for injection moulding. *[2]*

(ii) Describe **one** advantage of producing the tray by injection moulding. *[2]*

(b) (i) Define *cost effectiveness*. *[1]*

(ii) Outline **one** reason why the design of the tray makes it cost-effective to produce. *[2]*

(iii) Identify **one** criterion that could be used to evaluate the effectiveness of the tray for users. *[2]*

(c) Discuss the design considerations to enhance the greenness of the tray. *[11]*

6. Figure 6 shows a full-size clay model of a car being used to undertake user research at a motor show. The clay covers a sub-frame to which the wheels are attached.

Figure 6

(a) (i) List **two** features of the design of the car that the designer cannot get feedback on from the clay model. *[2]*

(ii) Outline **one** physical property of clay that makes clay a suitable material for the model. *[2]*

(b) (i) Define *user research*. *[1]*

(ii) Describe **one** disadvantage of using user research to evaluate the potential success of the car. *[2]*

(iii) Outline the scale of production of the clay model. *[2]*

(c) Evaluate how the use of clay in this context is consistent with a green design philosophy. *[11]*