

Surname		Other Names	
Centre Number		Candidate Number	
Candidate Signature			

For Examiner's Use
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General Certificate of Education  
 June 2007  
 Advanced Level Examination



**COMPUTING**  
**Unit 5 Advanced Systems Development**

**CPT5**

Tuesday 19 June 2007 9.00 am to 10.30 am

<p><b>You will need no other materials.</b>          You may use a calculator.</p>
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Time allowed: 1 hour 30 minutes

**Instructions**

- Use blue or black ink or ball-point pen.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- Answer the questions in the spaces provided.
- Show all your working.
- Do all rough work in this book. Cross through any work you do not want to be marked.

**Information**

- The maximum mark for this paper is 65.
- The marks for questions are shown in brackets.
- The use of brand names in your answers will **not** gain credit.
- You are reminded of the need for good English and clear presentation in your answers.

For Examiner's Use			
Question	Mark	Question	Mark
1		5	
2			
3			
4			
Total (Column 1)		→	
Total (Column 2)		→	
TOTAL			
Examiner's Initials			

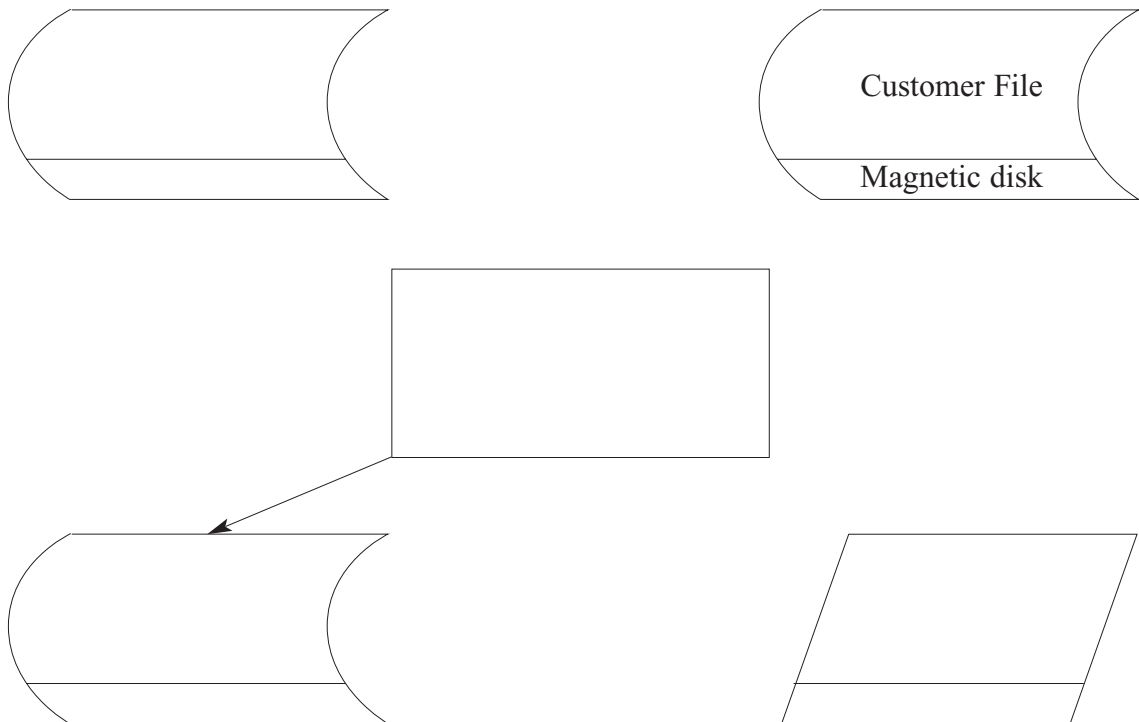
Answer **all** questions in the spaces provided.

- 1 The diagram shown in **Figure 1** describes the hardware and software components of a system that is used to **produce monthly statements** for account customers of a department store chain.

A computer program reads the **transactions file** from **magnetic tape** and updates the **customer file** held on **magnetic disk**. The program sends the **monthly statements** to the **printer**. Any errors are sent to an **error log file** on **magnetic disk**.

- (a) Complete the diagram shown in **Figure 1**.

**Figure 1**



(5 marks)

- (b) Name this type of diagram.

.....

(1 mark)

2 An architect has been asked to design a ‘smart’ home using components of a computer-controlled home automation system, for a client who uses a wheelchair. The client cannot stand easily and has limited use of their arms.

The architect has the following components to choose from:

- Radio-frequency remote controls
- Programmable switching units to control appliances
- Movement detectors
- CCTV (Closed Circuit TV)
- Fingerprint door locks
- Climate control system
- Motors to operate doors/curtain-rails/shutters
- Voice recognition system

For **three** of the above devices, state the device and explain its use for a home automation system and why it would help the client.

Device 1: .....

Use: .....

.....

Why: .....

.....

Device 2: .....

Use: .....

.....

Why: .....

.....

Device 3: .....

Use: .....

.....

Why: .....

.....

(6 marks)

3 Imagine you have just taken the job of programmer for AQA Solutions, a large software development company. You are assigned the task of corrective maintenance of software, which was developed by a programmer who no longer works for AQA Solutions.

(a) During the beta testing phase, several bugs have been reported.

(i) What is beta testing?

.....  
.....

(1 mark)

(ii) Name **four** types of information you expect to find in maintenance documentation and explain how each would assist you in your task of correcting the reported bugs.

1. Type of information: .....

How it would help: .....

.....  
.....

2. Type of information: .....

How it would help: .....

.....  
.....

3. Type of information: .....

How it would help: .....

.....  
.....

4. Type of information: .....

How it would help: .....

.....  
.....

(8 marks)

(b) Explain **three** programming techniques that the original programmer could have used that would make it easier for you to correct the original programmer's software.

- 1 .....
- .....
- .....
- 2 .....
- .....
- .....
- 3 .....
- .....
- .....

*(3 marks)*

(c) Name **two** types of testing, other than beta testing, you should use before you declare your task successfully completed.

- 1 .....
- 2 .....

*(2 marks)*

**Turn over for the next question**

4 Tom’s family has asked you for some advice about networking. They have just moved to a new house, currently without any communication links. They want Internet access for the family desktop computer.

(a) Describe the **differentiating** features of *dial-up*, *cable-modem* and *ADSL* connections.

(i) dial-up .....  
.....  
.....

(ii) cable-modem .....  
.....  
.....

(iii) ADSL .....  
.....  
.....

(6 marks)

(b) Tom’s parents both use laptop computers at work and would like to be able to use these at home to access the Internet and to access personal files left on the family desktop computer.

(i) Explain how this could be achieved by setting up a peer-to-peer network.  
.....  
.....  
.....  
.....

(3 marks)

(ii) Explain how this could be achieved by setting up a client-server network.  
.....  
.....  
.....  
.....

(3 marks)

(c) Tom’s mother’s laptop computer is set up with an IP address of 192.168.28.175 and Tom’s father’s laptop computer uses IP address 192.168.15.12.

(i) What would be a sensible IP network ID? .....  
(1 mark)

(ii) What is the range of IP addresses available for the family desktop computer?  
.....  
(2 marks)

(iii) What would be the subnet mask for this network?  
.....  
(1 mark)

(d) Tom’s parents are worried about the possible risks of viruses and data security threats through the Internet connection.

Explain what measures they should take to minimise the risk of:

(i) virus attack.  
.....  
.....  
(1 mark)

(ii) unauthorised access to data held on the laptop computers.  
.....  
.....  
(1 mark)

(e) The family’s computers could be linked using cable or wireless connections.

(i) What type of cable would be required for the cabled connection?  
.....  
(1 mark)

(ii) What hardware would be required for the wireless connection?  
.....  
(2 marks)

(iii) Give **one** advantage of wireless over cabled connection.  
.....  
.....  
(1 mark)

(iv) Give **one** disadvantage of wireless over cabled connection.  
.....  
.....  
(1 mark)

- 5 A chef keeps her recipes on a single-table database system. **Figure 2** shows the Recipe Table.

**Figure 2**

Recipe ID	Dish	RecipeIngredients (including quantity)	Preparation Time	Cooking Time	Number of Servings	Cooking Instructions
1	Hummus	250g chickpeas 6 cloves garlic 50ml lemon juice 340g tahini	20 minutes	2 hours	8	Cook chickpeas until soft. Puree in food processor. Add remainder of ingredients, mix well.
2	Feta Salad	400g tomatoes 250g feta cheese 1 cucumber 50g olives 45ml vinaigrette	15 minutes	none	4	Mix all salad ingredients together. Season with salt and pepper. Dress with vinaigrette.
3	Casserole	500g chickpeas 400g tomatoes 450g potatoes	10 minutes	2 hours	4	Cook chickpeas until nearly soft. Add cubed potatoes and tomatoes. .....
:	:	:	:	:	:	:
:	:	:	:	:	:	:

The chef's only supplier provides her with an on-line price list for her ingredients. **Figure 3** shows the PriceList Table.

**Figure 3**

FoodItemID	FoodItemName	PackSize	Price
Tom001	Tomatoes	400g	£0.55
Chi002	Chickpeas	250g	£0.75
Cuc003	Cucumber	single	£0.50
:	:	:	:

- (a) (i) Which of the above two tables is **not** in First Normal Form? .....  
(1 mark)

- (ii) Why? .....

.....  
(1 mark)



(b) The chef would like to be able to cost the ingredients for her dishes and is asking you to help her design a database which would allow the costing of dishes without retyping any of the pricelist details.

Database theory states that database tables should be *fully normalised*.

(i) What does fully normalised mean?

.....  
.....  
*(2 marks)*

(ii) Why is it desirable that tables are fully normalised?

.....  
.....  
*(1 mark)*

(c) When the data in **Figure 2** and **Figure 3** are stored in a fully normalised relational database, three relations, **Recipe**, **FoodItem** and **RecipeIngredient** are needed. For each of these, complete the relations, making sure the primary key attribute(s) are underlined.

(i) Recipe( .....  
.....)  
*(1 mark)*

(ii) FoodItem( .....  
.....)  
*(1 mark)*

(iii) RecipeIngredient( .....  
.....)  
*(4 marks)*

(d) Using the SQL commands SELECT, FROM, WHERE, ORDER BY and any others that you consider appropriate, write the SQL statement to list all the ingredients and their quantities required for Feta Salad. The results table should also show the pack size of the food item and the associated price. The list should be in alphabetical order of ingredient.

.....  
.....  
.....  
.....  
.....  
*(5 marks)*

**END OF QUESTIONS**

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