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General Certificate of Education
 January 2006
 Advanced Subsidiary Examination



COMPUTING **CPT2**
Unit 2 Principles of Hardware, Software and Applications

Friday 13 January 2006 1.30 pm to 3.00 pm

You will need no other materials.
 You may use a calculator.

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.
- All working must be shown.
- Do all rough work in this book. Cross through any work you do not want 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. Quality of Written Communication will be assessed in these answers.

For Examiner's Use			
Number	Mark	Number	Mark
1		9	
2		10	
3		11	
4		12	
5			
6			
7			
8			
Total (Column 1)		→	
Total (Column 2)		→	
TOTAL			
Examiner's Initials			

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

- 1 **Figure 1** shows a label from an item sold in a shop. The data from this label is captured by a computer system at the checkout.

Figure 1



- (a) What input device would have been used in the shop to read this label?

.....
 (1 mark)

- (b) (i) Give **one** advantage of having the label read by the input device given in (a) rather than having the numbers keyed in by the shop assistant.

.....

 (1 mark)

- (ii) This type of code is used to identify items in many different situations. State **one** advantage that it has over a character code that makes it suitable for this task.

.....

 (1 mark)

- 2 (a) Describe what is meant by *secondary storage*.

.....

 (2 marks)

- (b) Which of the following is **not** a secondary storage medium?
 floppy disc, flash memory, cache memory, CD-Rom

.....
 (1 mark)

3

3

3 A new method of medical diagnosis called ‘telemedicine’ is being trialled. Medical information about a patient’s condition can be sent from a computer in their doctor’s surgery to the computer of a specialist doctor in a hospital, which could be many miles away. Psychiatric interviews can also take place in real time between a patient in the doctor’s surgery and a psychiatrist in the hospital.

(a) What type of device would be used for input to the computer system in the doctor’s surgery in the following situations? Your three devices must be different.

i. The specialist needs to know the temperature of the patient.	
ii. The patient has a strange rash on his/her arm and the specialist needs to see the rash.	
iii. The patient is to have an interview in real time with a psychiatrist in another hospital.	

(3 marks)

(b) Give **one** advantage of telemedicine to each of the following. Your three advantages must be different.

(i) A doctor working in a remote area of the world.

.....

(1 mark)

(ii) The National Health Service.

.....

(1 mark)

(iii) A patient.

.....

(1 mark)

4 DeskTop Publishing is the use of specialist software and principles of design, to design, edit, and produce professional looking documents.

(a) Give **two** different types of document for which DeskTop Publishing software would be a sensible choice.

1

2

(2 marks)

(b) When designing your work using this software, you will choose a suitable typeface, font style, size and colour. Give **two** other settings which you could specify using DeskTop Publishing software.

1

2

(2 marks)

5 Sam left school on the afternoon of his last A-level paper, which just happened to be on the day of his 18th birthday. That evening he went with his mother to donate blood for the first time.

Sam is now a trainee manager with one of the large supermarket chains. He has opened a bank account.

Based only on the information given above, name **three** organisations, apart from the school he has just left, which would hold personal details on Sam.

For each of these organisations, give **one** different single item of personal data they would hold, in addition to his name, full address and telephone number.

Each item of data must be one field of a record and each item must be different.

Organisation	Item of Data

(6 marks)

4

6

6 Mr and Mrs Young run a small business making pine furniture. Mr Young is a carpenter, and Mrs Young makes chair covers, cushions and curtains. They sell some of their goods from a small shop and also take orders for specific items to be made. Every now and then they have special offers and they like to notify their regular customers of these.

When they started their business, a neighbour created a computerised system for them to record their products, sales and orders. The system uses a number of flat files, including the following:

SALE(InvoiceNo, ProductID, Description, Price, QuantitySold, CustomerName, CustomerAddress, CustomerPostCode, DateSold)

ORDER(OrderNo, CustomerName, CustomerAddress, CustomerPostCode, TelephoneNumber, ItemOrdered, Price, QuantityOrdered, DateOfOrder)

PRODUCTMADE(ProductID, Description, DateCompleted, Price)

(a) Explain, with an example from this system, the meaning of the term *data inconsistency*.

Meaning

.....
.....

Example

.....
..... (3 marks)

(b) Explain how this problem could be avoided, without losing any of the information they currently hold about customers, sales and orders, if the Youngs created a relational database.

.....
.....

(1 mark)

(c) Give **two** other advantages to Mr and Mrs Young of using a database for their business.

1

.....

2

.....

(2 marks)

- 7 (a) Give **three** different reasons why a spreadsheet application package is particularly useful for the analysis of data.

1

.....

2

.....

3

.....

(3 marks)

- (b) A school teacher, marking tests for a number of students, entered the results in a spreadsheet as she marked each test.

	A	B	C	D	E
1	Name	Mark / 50	Grade		
2	Patel M	37	P		42
3	Kapoor C	45			35
4	Adams G	29			
5	Brown G	37			
6					

Once the marks had all been entered, the teacher sorted the data into mark order, with the highest mark at the top. Where two students had the same mark, their names were sorted into alphabetical order.

- (i) Give the first column on which the data was sorted, and the order (Ascending or Descending).

Column in Order
(2 marks)

- (ii) Give the next column on which the data was sorted, and the order (Ascending or Descending).

Column in Order
(2 marks)

(c) The formula in cell C2 is

IF(B2<=\$E\$3, "F",IF(B2<=\$E\$2, "P", "D"))

The symbol \$ indicates absolute cell addressing.

This formula is copied down column C.

(i) Why is absolute cell addressing used in this formula?

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

(ii) Write the formula in cell C5.

.....
(1 mark)

(iii) After the formula is copied, what is displayed in the following cells?

Cell C3
(1 mark)

Cell C4
(1 mark)

8 (a) Why is data often encrypted when transmitted over a network? Give **two** reasons.

1
2
(2 marks)

Question 8 continues on the next page

(b) One simple method of encryption used in transmitting data is known as transposition. In one transposition method, data is placed in a grid with five columns and as many rows as are necessary to hold the data. The data is entered row by row and transmitted column by column.

(i) Using the grid below, encrypt the data string

'MEET*IN*USUAL*PLACE*TOMORROW*2215**'

Encrypted data
.....
(1 mark)

(ii) Using the same system in the grid below, decode the following received message.

'S*IPT**O-OPMWCR*ROEIORP*INTPYRANTHS'

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

9 Among the legislation which affects computer users are the following:

- A. The Copyright, Design and Patents Act (1988);
- B. The Computer Misuse Act (1990);
- C. The Health and Safety (Display Screen Equipment) Regulations 1992;
- D. The Data Protection Act (1998);
- E. The Regulation of Investigatory Powers Act (2000).

In the following situations, actions are taken in order to comply with one or other of the above Acts and Regulations. In each case, identify the relevant legislation which is being followed.

- (a) In the firm where Amelli works the state and condition of all workstations are checked once a year.

.....
(1 mark)

- (b) Mary started a new job and gave details such as address and next of kin. She was given a printout of her record on the firm's computer and saw that her address was incorrect, so she pointed this out to her supervisor. The following day she was given an amended version and saw that the error had been corrected.

.....
(1 mark)

- (c) John downloaded a new piece of software from the Internet. While installing it, he was invited to register – and pay – for it. He did so straight away.

.....
(1 mark)

- (d) Manesh started a new job. During his induction process it was explained very carefully to him that the network manager made spot checks on the e-mails that staff were receiving and sending from their workstations.

.....
(1 mark)

10 (a) Give **three** operational characteristics of a batch operating system.

1

.....

2

.....

3

.....

(3 marks)

(b) **Figure 2** shows an order form for a charity which sells Christmas cards. Orders are entered into their system using batch processing.

Figure 2

CUSTOMER			Delivery Address if different			
Mr/Mrs/Ms/ Other Surname	Mrs SMITH		Mr/Mrs/Ms/ Other Surname			
Address	24, LONGACRE NEWTOWN ANYSHIRE		Address			
Post Code	AB23 4CD		Post Code			
Daytime Tel. No.	01234 567567		Daytime Tel. No.			
Page	Item Number	Description	Quantity	Price	£	p
27	550-116-16	THE HOLLY AND THE IVY	2	4.99	9	98
29	550-017-26	SNOWDROPS	3	3.75	11	25
TOTAL COST				21	23	
P&P				4	99	
DONATION – Thank You				10	00	
TOTAL PAYABLE				36	22	

Control Totals and *Hash Totals* are methods of detecting and preventing corrupted or missing data in a batch processing environment.

(i) What is the fundamental difference between a hash total and a control total?

.....

.....

(1 mark)

(ii) Explain the process of applying such checks to the batch processing of the order forms.

.....
.....
.....
.....

(3 marks)

(iii) Suggest which of the fields on the order form would be suitable for each check.

Field for Control total
(1 mark)

Field for Hash total
(1 mark)

9

11 When a member of staff logs onto a computer in a particular organisation, they enter their User_name and password. The password has to be at least 8 characters long and must include both letters and numbers.

(a) Why do organisations set rules for acceptable user passwords?

.....
(1 mark)

The file **Password** is used by the computer system to authenticate (check) the identity and password typed at a keyboard when a user logs onto the system. The password is input to the logon program as an alphanumeric string and converted to a two-byte integer using a hashing function or algorithm before being sent across a network for authentication (checking).

(b) Outline **three** major steps that a typical hashing function / algorithm would use to convert an alphanumeric string into a two-byte integer.

1
.....

2
.....

3
.....

(3 marks)

Turn over for the next question

4

12 A charity holds details of volunteer helpers in a sequential file called **Helpers**. The primary key field is **HelperId**.

When a helper leaves, a program is run to remove their record from the file. This produces a temporary new copy of the **Helpers** file called **NewHelpers**.

Complete the processing steps required by this program:

Open **Helpers** file for reading

Open **NewHelpers** file for writing

Read record from file **Helpers** including **HelperId**

While

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

(5 marks)

5

END OF QUESTIONS