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Centre Number					Learner Registration Number				
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Pearson BTEC Level 3 Nationals Certificate, Extended Certificate, Foundation Diploma, Diploma, Extended Diploma

Time 1 hour 45 minutes

Paper reference	31769H
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Computing

UNIT 2: Fundamentals of Computer Systems

You do not need any other materials.	Total Marks
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Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and learner registration number.
- Answer **all** questions.
- Answer the questions in the spaces provided
– *there may be more space than you need.*

Information

- The total mark for this paper is 80.
- The marks for **each** question are shown in brackets
– *use this as a guide as to how much time to spend on each question.*
- You may use a calculator.

Advice

- Read each question carefully before you start to answer it.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ►

P71604A

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Answer ALL questions. Write your answers in the spaces provided.

1 Anna owns a wholesale food company. The company uses a variety of computer systems in its office and warehouse.

(a) The company uses a database to keep track of customers, suppliers and stock.

Give **three** features of a database that make it suitable for the company's needs.

(3)

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(b) The company uses digital scales in the warehouse.

The digital scales have displays that show denary (base 10) numbers.

Figure 1 shows one of the displays that is used.



Figure 1

The data is sent to the display coded as binary coded decimal (BCD).

Write the BCD string that would produce the number shown in **Figure 1**.

(2)

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(c) A computer system in the warehouse stores numbers as standard 8-bit binary numbers.

The table shows two items and the quantity of each item purchased by a customer.

Complete the table to show:

- the quantity of each item as an 8-bit binary number
- the total quantity of items as an 8-bit binary number.

(3)

	Qty	Quantity (8-bit binary)
Item 1	146	
Item 2	22	
Total (8-bit binary)		

(d) Explain **one** drawback of using standard 8-bit binary numbers to store the quantity and total for the warehouse system.

(3)

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The company uses barcodes on items in the warehouse. The barcode stores the item's unique ID (Item_code).

Figure 2 shows an example barcode.



Figure 2

When preparing orders the workers use a barcode scanner to capture the data for each item.

(e) Explain the most appropriate communication channel for a barcode scanner.

(2)

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(f) The item code can also be entered using a keyboard.

Explain **two** reasons why a barcode scanner might be a more suitable input device.

(4)

Reason 1

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Reason 2

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(g) The computer system uses a checksum to detect errors in data.

Describe how a checksum could be used to check if the item code in **Figure 2** is a valid code.

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QUESTION 2 BEGINS ON THE NEXT PAGE



2 Jacques owns a restaurant. He is planning to make greater use of computer systems to support the business and improve customer experience.

Jacques' computer system needs are:

- enable staff serving at tables to collect orders
- communicate orders to the kitchen staff
- monitor stock levels
- manage customer bills and payments
- provide entertainment for customers.

(a) Jacques will need to buy the hardware that will be installed.

State **three other** costs that Jacques will have when introducing the new computer systems.

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(b) Explain **two** output devices that the restaurant could use to meet the identified needs.

(4)

Device 1

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Device 2

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(c) The restaurant offers some special discounts off customers' bills.

The discounts offered are:

- 5% off the bill if it is a customer's birthday (proof required)
- 10% off the bill for customers with a loyalty card
- 20% off the bill every weekday between 5 pm and 7 pm.

It is acceptable for customers to receive all three discounts on a single bill.

Draw a flow chart that shows the logic used by the system when calculating the discount and then outputting the final total for the bill.

Use the space provided on page 11 to draw your flow chart.

(6)

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(d) The system records items ordered by a customer. The data is stored in an array.
The system uses the items in the array when calculating the final total for the bill.
Explain **two** reasons why arrays are suitable data structures for this task.

(4)

Reason 1

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Reason 2

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(e) Jacques would also like customers to be able to select entertainment at their table such as sports and music videos.

This part of the system will use a graphical user interface (GUI).

Explain why using a GUI would provide a good user experience.

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QUESTION 3 BEGINS ON THE NEXT PAGE



3 A small village library currently uses a single desktop PC to manage book loans.

The library wishes to install a new networked computer system that will provide:

- Two PCs for staff to use to manage loans, members and other administrative tasks.
 - Four PCs for members of the public to use for research and productivity tasks.
 - Wi-Fi access for library users with their own mobile devices.
 - A website for people to use to reserve books they want to borrow.
- (a) To use the library PCs users are provided with a temporary username and password that expire after a set amount of time.

Explain **two other** ways the library could prevent accidental or malicious damage to data.

(4)

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(b) The library processes a large amount of data about customers, books and loans.

Analyse how the computer system will make use of validation when processing data.

You should provide examples to support your analysis.

(6)

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(c) The library will need to backup the data that it holds.

Discuss backup and recovery procedures that the library could use.

You should provide justification and examples to support your discussion.

(8)

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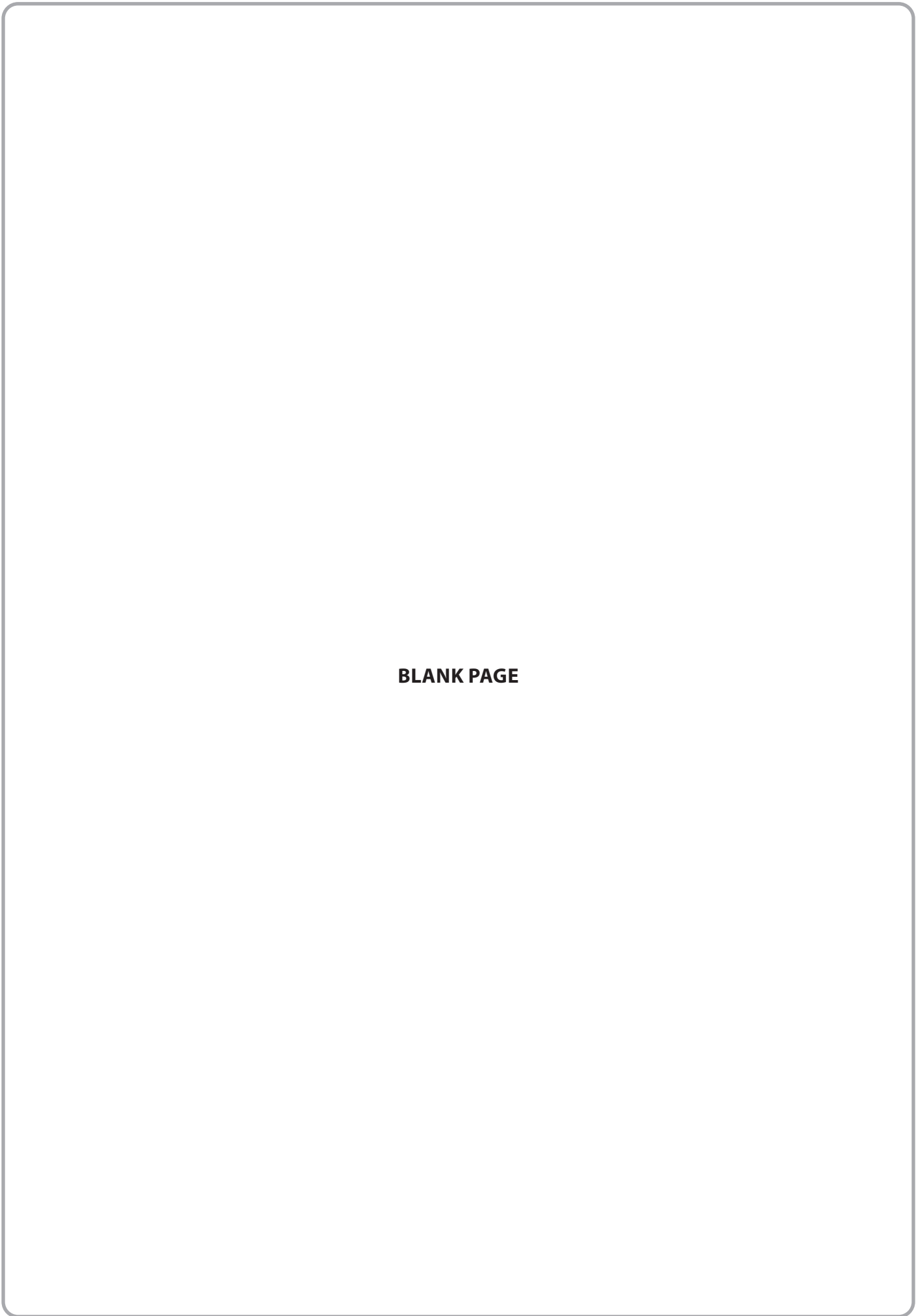
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(Total for Question 4 = 22 marks)

TOTAL FOR PAPER = 80 MARKS





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