Surname	Centre Number	Candidate Number
First name(s)		2

GCE AS/A LEVEL

S25-2500U10-1

2500U10-1

TUESDAY, 13 MAY 2025 – AFTERNOON

COMPUTER SCIENCE – AS unit 1
Fundamentals of Computer Science

2 hours

For Examiner's use only		
Question	**Maximum Mark**	**Mark Awarded**
1.	**6**	
2.	**4**	
3.	**11**	
4.	**9**	
5.	**6**	
6.	**15**	
7.	**7**	
8.	**10**	
9.	**8**	
10.	**6**	
11.	**6**	
12.	**12**	
Total	**100**	

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ADDITIONAL MATERIALS

A calculator.

INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen. Do not use gel pen or correction fluid.

You may use a pencil for graphs and diagrams only.

Write your name, centre number and candidate number in the spaces at the top of this page.

Answer **all** questions.

Write your answers in the spaces provided in this booklet. If you run out of space, use the additional page(s) at the back of the booklet, taking care to number the question(s) correctly.

INFORMATION FOR CANDIDATES

The number of marks is given in brackets at the end of each question or part-question.

The total number of marks available is 100.

Assessment will take into account the quality of written communication used in your answers.

Examiner only

Answer **all** questions.

1. Input devices facilitate interaction with a computer system.

Choose **two** applications and describe the use of a different input device for each application. Give **one** advantage and **one** disadvantage for each input device. [6]

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2. Complete the missing column headings in this truth table by adding the correct Boolean expressions. [4]

A	*B*	*C*				
0	0	0	1	1	0	1
0	1	0	1	1	1	0
1	0	0	0	1	0	1
1	1	0	0	1	0	1
0	0	1	1	0	0	0
0	1	1	1	0	1	1
1	0	1	0	0	0	0
1	1	1	0	0	0	0

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3. (a) Describe **two** advantages and **two** disadvantages of parallel transmission over serial transmission. [4]

(b) Describe what happens when more than one data packet is detected on a bus network simultaneously. [2]

(c) Explain how a packet is routed on a packet-switched network. [5]

Examiner only

4. (a) Showing your workings, use binary addition to add 01011.010_2 and 01101.101_2. Convert your answer into denary. [3]

(b) State the effect of truncation and rounding to one decimal place in your answer to **4**(a). Calculate the relative and absolute error that would result from each method. [6]

Turn over.

Examiner only

5. Simplify the given Boolean expression using only Boolean identities and rules, clearly showing each step.

Do not use truth tables for this simplification. [6]

$$(C + B) \cdot (\overline{B} + C) + \overline{\mathrm{A}} \cdot (1 + C)$$

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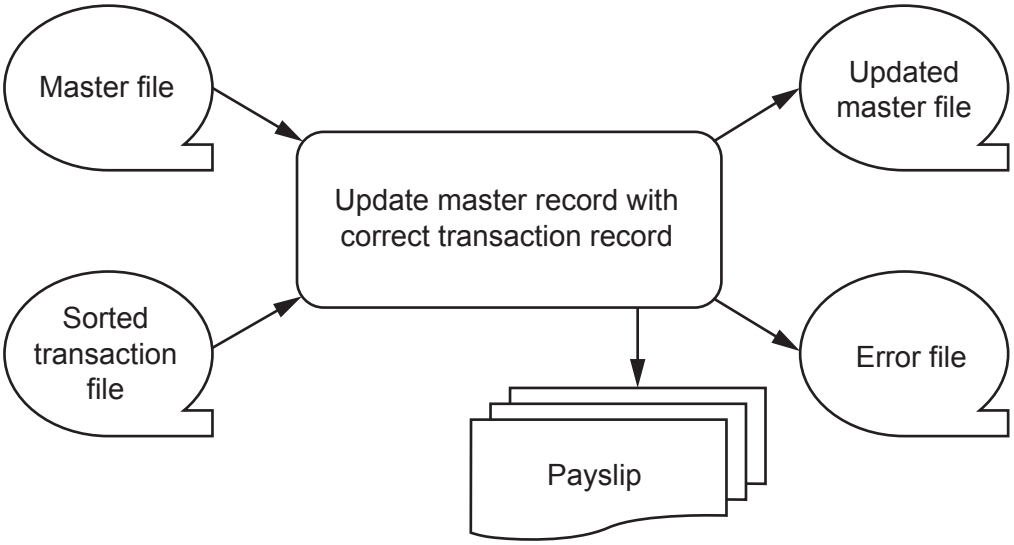
Examiner only

6. A payroll system uses a master file and a transaction file to generate a payslip.



(a) Complete the data structure design for the files used in this application by:
- completing any missing field names
- clearly marking any key fields
- suggesting a different suitable validation technique for **one field in each file**. [5]

MASTER FILE

Field name	Primary Key (Y/N)	Data type	Validation
		Integer	
First name		String	
Surname		String	
Address		String	
Job title		String	
Date of birth		Date / Time	
Tax code		String	
Gross pay to date		Real	
Net pay to date		Real	
Holiday pay to date		Real	
Sick pay to date		Real	
Overtime pay to date		Real	

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SORTED TRANSACTION FILE

Field name	Primary Key (Y/N)	Data type	Validation
		Integer	
Date		Date / Time	
Hours worked		Real	
Gross pay		Real	
Net pay		Real	
Holiday pay		Real	
Sick pay		Real	
Overtime pay		Real	

(b) Describe the most suitable mode of operation for this application. [4]

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(c) Discuss the benefits of a relational database system over a flat file database system. [6]

Examiner only

7. Discuss various ways in which an operating system provides an interface between the user and the hardware. [7]

Examiner only

8. Programmers make use of a range of constructs and features.

(a) Describe the terms variable and parameter. [6]

(b) Describe the scope and lifetime of variables used in a program. [4]

Examiner only

9. Write an algorithm, using pseudo-code, which converts an 8-bit binary number into denary. Your algorithm should include a suitable validation check. [8]

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10. Describe the difference between alpha and beta testing in system development. [6]

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11. Explain how different Integrated Development Environment (IDE) tools are used **in debugging programs**. [6]

Examiner only

12. A program written using a high-level programming language is intended to add ten numbers input by a user. This program is to be **compiled** but contains errors.

```
1  Start addNumbers
2  number is integer
3  total is integer
4
5  for i = 1 to 10
6    ouptut "Please enter next number"
7    input number
8    total = total + number
9  next i
10
11 grandTotal = total
12 output "The total = ", grandTotal
13 End addNumbers
```

Describe the different stages of compilation, relating these stages to the compilation of this specific program. [12]

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END OF PAPER

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