Surname	Centre Number	Candidate Number
Other Names		2

GCE AS

B500U10-1

S19-B500U10-1

COMPUTER SCIENCE – AS component 1
Fundamentals of Computer Science

TUESDAY, 21 MAY 2019 – MORNING

2 hours

For Examiner's use only		
Question	**Maximum Mark**	**Mark Awarded**
1.	**6**	
2.	**8**	
3.	**6**	
4.	**9**	
5.	**7**	
6.	**6**	
7.	**6**	
8.	**10**	
9.	**11**	
10.	**8**	
11.	**6**	
12.	**6**	
13.	**11**	
Total	**100**	

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ADDITIONAL MATERIALS

A calculator.

INSTRUCTIONS TO CANDIDATES

Use black ink or black ball point pen.

Write your name, centre number and candidate number in the space 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 continuation page 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.

You are reminded of the need for good English and orderly, clear presentation in your answers.

The total number of marks available is 100.

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Answer **all** *questions.*

1. Name and describe the transmission method for each of the following:

(a) Using a parallel interface to send data to a printer. [2]

(b) Sending data input from a keyboard. [2]

(c) Sending data across a network using a switch. [2]

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2. Describe the function of **four** of the main components in a contemporary CPU architecture. [8]

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3. Describe **three** methods used to ensure file security. [6]

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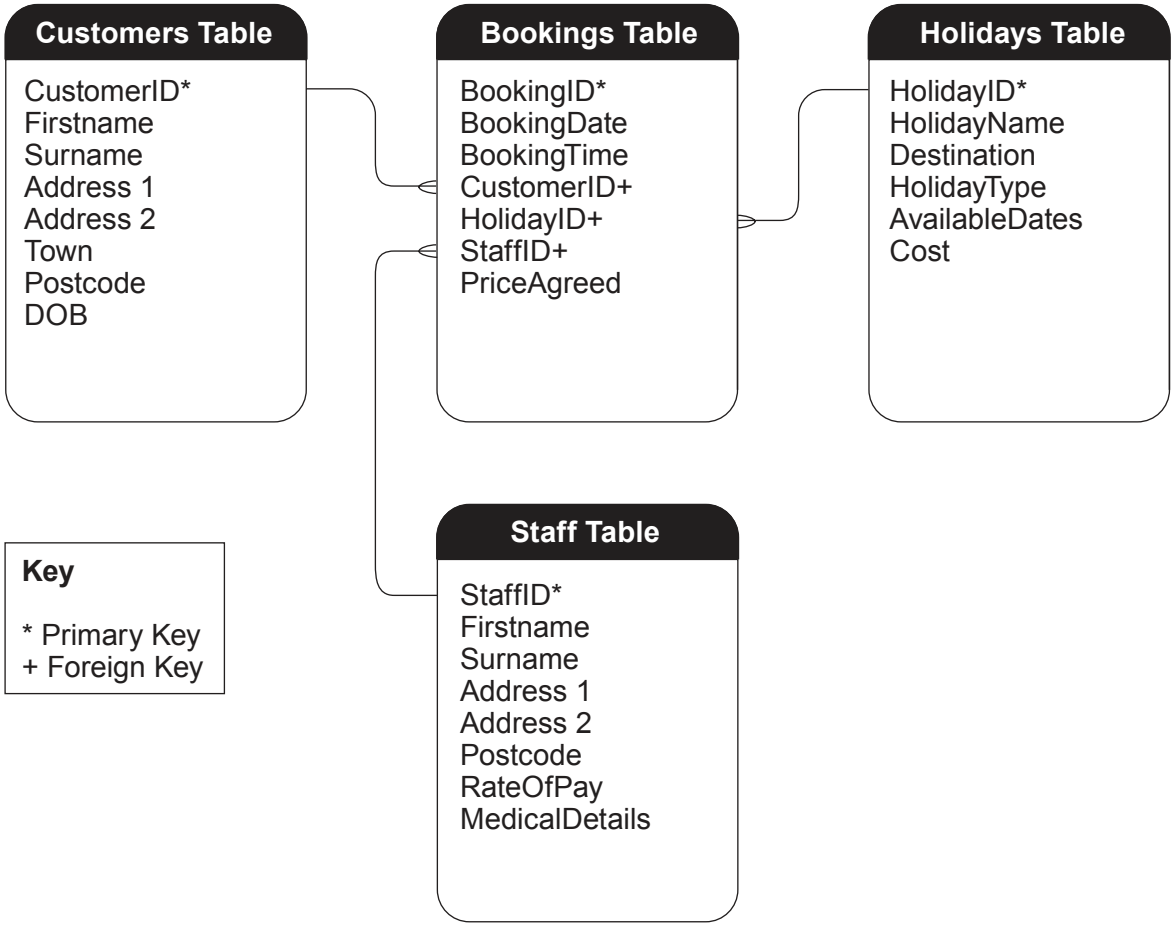
4. ***Happy Hols*** travel agents uses the following database structure to store details about its customers, holidays, bookings and staff.



(a) (i) Describe the features of this type of database structure. [3]

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(ii) Describe the benefits and drawbacks of this type of database structure. [4]

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(b) Using an example from the structure on page 5, give **one** advantage of different users having different views of the data in this database. [2]

Advantage .....

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5. Write an algorithm, using pseudo-code, which will allow chemistry students to input the group number (1-18) and the period number (1-7) of an element in the partially complete periodic table below.

PeriodicTableArray

		Group																
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**
Period	**1**	H																	He
	2	Li	Be											B	C	N	O	F	Ne
	3	Na	Mg											Al	Si	P	S	Cl	Ar
	4	K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr
	5	Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe
	6	Cs	Ba	La	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn
	7	Fr	Ra	Ac	Rf	Db	Sg	Bh	Hs	Mt	Ds	Rg	Cn	Nh	Fl	Mc	Lv	Ts	Og

Your algorithm should output the chemical symbol (e.g. Li) or a suitable error message if the element does not exist for the numbers entered.

Your algorithm should be written using self-documenting identifiers. [7]

B500U101 07

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6. Clearly showing each step, simplify the following Boolean expression using Boolean algebra and identities: [6]

$$R.(\overline{S} + R) + Q.(\overline{Q} + P) + Q.(1 + P)$$

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7. Describe the use of **three** types of utility software. [6]

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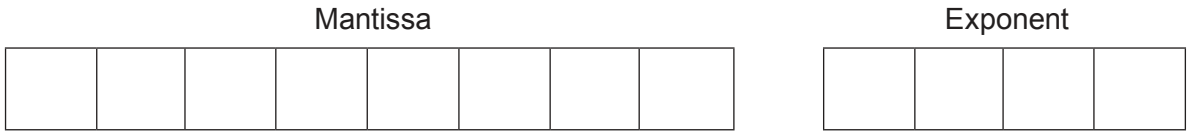
8. *(a)* In a certain computer system, real numbers are stored in normalised floating-point form using a positive 8 bit mantissa and a positive 4 bit exponent.



Calculate the denary range of positive real numbers that can be stored in this normalised floating-point form.

Show all your workings. [6]

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(b) Using the number 11.10111_2, describe truncation and rounding to **two** binary places, and calculate their effect upon accuracy in terms of their absolute errors. [4]

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9. A program written using a high-level programming language is intended to add five numbers that are input by a user. This program is to be compiled.

```
1   Start addProc
2   number is integer
3   a is integer
4   total is integer
5   a = 0
6
7   for i = 1 to 5
8      output "Please enter next number"
9      ipnut number
10     a = a + number
11  next i
12
13  total = a
14  output "The total = ", total
15
16  End addProc
```

(a) Line 10 is split into the following tokens and all whitespace is removed:

Token
a
=
a
+
number

Name the compilation stage where this would occur. [1]

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(b) Identify the error that exists in this program and state at which stage of the compilation process it would be detected. [2]

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(c) Memory locations are allocated to the variables `number`, `a` and `total`. Name the compilation stage where this would occur. [1]

(d) Name the compilation stage at which the inefficient use of memory in Line 13 would be addressed. [1]

(e) Describe the differences between high-level and low-level languages. [6]

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10. A compiler is one of the tools available in an Integrated Development Environment (IDE). Describe the use of other tools available to a programmer in an IDE. [8]

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11. Describe the contents of user documentation and maintenance documentation. [6]

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12. *(a)* Identify **three** potential threats to computer systems. [3]

(b) Describe contingency planning for disasters which affect computer systems. [3]

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13. The role of a systems analyst is to develop computer solutions to given problems.

One consideration for a systems analyst when developing a new solution is the human-computer interaction (HCI). Explain the different types of HCI that could be considered to suit a variety of different users in different environments.

Discuss different changeover methods a systems analyst may consider. [11]

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END OF PAPER

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