Surname	Centre Number	Candidate Number
Other Names		2



GCE AS/A LEVEL - NEW

2500U10-1



COMPUTER SCIENCE – AS unit 1Fundamentals of Computer Science

MONDAY, 5 JUNE 2017 - MORNING

2 hours

For Exa	aminer's us	e only
Question	Maximum Mark	Mark Awarded
1.	2	
2.	10	
3.	10	
4.	8	
5.	6	
6.	6	
7.	11	
8.	6	
9.	4	
10.	8	
11.	8	
12.	4	
13.	5	
14.	12	
Total	100	

ADDITIONAL MATERIALS

The use of a calculator is permitted in this examination.

INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen.

Answer all questions.

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

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.

The total number of marks available is 100.

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

Answer all questions.

Complete the following truth table. 1.

[2]

Α	В	A AND B	B XOR (A AND B)
0	0		
0	1		
1	0		
1	1		

a typical use and	storage capacity fo	or each.	ves (HDD) and Optical	Drives and give [10

(a)	State what is meant by a protocol.						
(b)	Name the most appropriate protocols for each of the following: (i) Obtaining an IP address from a server.						
	(ii) Sending an email from one server to another.						
	(iii) The basic communication protocol used on the Internet.						
(c)	State the role of handshaking.	l					
(d)	Data is sometimes detected simultaneously on a bus network. State the name g this problem and describe how the network deals with it.	iven [
(e)	Describe how traffic is routed on a packet switched network.]					

an integer data type within a range of 0 ₁₀ to 127 ₁₀ . (ii) In a certain computer system, numbers are represented using sign and magni	١.	Diffe	Different primitive data types are used in computer systems.											
Give the range for a signed integer data type with the same storage requirem as question 4(a)(i). (b) Describe the use and advantages of the Unicode standardised character set. (c) Giving suitable examples compare the storage requirements for a character and a second content of the same storage requirements for a character and a second content of the same storage requirements for a character and a second content of the same storage requirements for a character and a second content of the same storage requirements for a character and a second content of the same storage requirements for a character and a second content of the same storage requirements for a character and a second content of the same storage requirements for a character and a second content of the same storage requirements for a character and a second content of the same storage requirements for a character and a second content of the same storage requirements for a character and a second content of the same storage requirements for a character and a second content of the same storage requirements for a character and a second content of the same storage requirements for a character and a second content of the same storage requirements for a character and a second content of the same storage requirements for a character and a second content of the same storage requirements for a character and a second content of the same storage requirements for a character and a second content of the same storage requirements for a character and a second content of the same storage requirements for a character and a second content of the same storage requirements for a character and a second content of the same storage requirements for a character and a second content of the same storage requirements for a character and a second content of the same storage requirements for a character and a second content of the same storage requirements for a character and a second content of the same storage requirements for a character and a second content of the same stor		(a)	(i)	Using the denary example 108_{10} , calculate the minimum storage requirements an integer data type within a range of 0_{10} to 127_{10} .	for [2]									
Give the range for a signed integer data type with the same storage requirem as question 4(a)(i). (b) Describe the use and advantages of the Unicode standardised character set. (c) Giving suitable examples compare the storage requirements for a character and a second content of the same storage requirements for a character and a second content of the same storage requirements for a character and a second content of the same storage requirements for a character and a second content of the same storage requirements for a character and a second content of the same storage requirements for a character and a second content of the same storage requirements for a character and a second content of the same storage requirements for a character and a second content of the same storage requirements for a character and a second content of the same storage requirements for a character and a second content of the same storage requirements for a character and a second content of the same storage requirements for a character and a second content of the same storage requirements for a character and a second content of the same storage requirements for a character and a second content of the same storage requirements for a character and a second content of the same storage requirements for a character and a second content of the same storage requirements for a character and a second content of the same storage requirements for a character and a second content of the same storage requirements for a character and a second content of the same storage requirements for a character and a second content of the same storage requirements for a character and a second content of the same storage requirements for a character and a second content of the same storage requirements for a character and a second content of the same storage requirements for a character and a second content of the same storage requirements for a character and a second content of the same storage requirements for a character and a second content of the same stor														
(c) Giving suitable examples compare the storage requirements for a character and a s			(ii)	In a certain computer system, numbers are represented using sign and magnitude. Give the range for a signed integer data type with the same storage requirement as question 4(a)(i).										
		(b)	Desc	cribe the use and advantages of the Unicode standardised character set.	[3]									
		(c)			ng [2]									

5.

Describe potential threats to computer systems and how contingency planning can help recover from disasters. [6]

2500U101

6.	Clearly showing each step, simplify the following Boolean expression:	
	$A.(\overline{A} + B) + C.(A + B) + \overline{A}.(B + C)$	
	[6]	

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(a)	Conv	vert th	e dena	ary nu	mbers	87 ₁₀	and 1	13 ₁₀ ii	nto the	eir equ	ivalen	t unsig	gned 8	3 bit bina	У
	Carr bina	y out ry ans	the bir	nary a o a he	dditior xadec	n of the	ne two	resu r.	Iting 8	bit bi	nary ı	numbe	rs. Co	onvert you	ır
	Show	w all c	of your	workin	ıgs.									[{	5]
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	••••••				••••••					•••••					
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(b)	(i)		certain s comp										-point	form usir	g
				Man	ntissa						Expo	onent			
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		Con	vert the	e numb	oer 4.1	25 ₁₀ i	nto thi	s float	ting-po	int for	m.			[;	3]
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	•••••														
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•••••														
(ii)	In the real n			outer	systen	n, the	follow	ing is	a float	ting-po	oint re	prese	entation	of a
			Man	tissa						Expo	nent			
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	Calcu floatin	late t g-poir	he de nt num	nary iber in	value ito a d	of th enary	ie ma numb	ntissa er	and	expor	ient, a	and (convert	this

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В.	can	yles-Hill College, students are able to study courses that are taught by teachers. A student study any number of courses, and each course is taught by a single teacher, although a her may teach more than one course.
	(a)	Using an example from this scenario, explain what is meant by a foreign key in a database. [2]
	(b)	Describe the difference between flat file and relational database systems. [1]
	(c)	Construct an entity relationship diagram to illustrate the scenario described at <i>Myles-Hill College</i> . [3]

9.	Describe the object-oriented approach to programming and the relationship between an object class and method. [4]

10.	Write an algorithm using pseudo-code that determines if a number entered (between 3 and 256 inclusive) is a prime number.				
	A prime number is a positive number that is divisible only by itself and 1.				
	Your algorithm should be written using self-documenting identifiers and include suitable inputs and outputs. [8]				

(a)	The	operating system enables the user to set up a hierarchical storage structure	e.
	(i)	Draw a clearly labelled diagram to illustrate a hierarchical structure.	[1]
	(ii) 	Give one advantage of using this structure.	[1]
(b)	canr	butes can be assigned to files by the operating system. For example a reachot be altered. The and describe three other file attributes.	d only file [6]

12.	Describe how bubble sort and insertion sort algorithms operate. [4] onl
		1

Examiner only

13.	 Explain how the Data Protection Act impacts on an organisation that stores data on a compusystem. 					

4.	Describe the difference between high and low level languages.
	Explain the role of the Integrated Development Environment (IDE) in developing high and low level language programs. [12]

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