



ASSESSMENT and
QUALIFICATIONS
ALLIANCE

Mark scheme

June 2003

GCE

Computing

Unit CPT4

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The following notation is used in the mark scheme

- ; - means a single mark;
- // - means alternative response;
- / - means alternative word or subphrase
- A. – means acceptable creditworthy answer;
- R. – means reject answer as not creditworthy;
- I. – means ignore.

1	Queue is FIFO ;	1	
	Stack is LIFO;	1	
	<i>Given that:</i>		
	Process of taking elements from queue to stack	1	
	Process of popping stack	1	
	Total		4
2	(a) interrupting device supplies; an <u>offset</u> ; A index, indexed address added to the <u>base address</u> ; A base register <i>Any two of these for 2 marks</i> gives start address of interrupt service routine / ISR;	2	
	R Interrupting device supplies start address of ISR	1	3
	(b) a different routine can be easily introduced / routine can be relocated / dynamically loaded (the interrupting device only needs to supply a new offset);	1	1
	Total		4
3	TForm1 = <u>Class</u> (TForm) Button1:Tbutton; Button2:Tbutton; End	1	
	<i>NB 1 mark for BOTH buttons</i>		
	// <u>Class</u> TForm1 extends TForm {Tbutton Button1; Tbutton Button 2; }	1	
	<i>Must look like code.</i> <i>1 mark for connecting TForm1 to TForm A inherits, :</i> <i>1 mark for defining both buttons as type Tbutton A As</i> <i>1 mark for {} or End</i>		
	Total		3

4	(a)	(i)	positive	1	
		(ii)	$<2^{-2}$	1	2
	(b)	Correct answer 194.5 or 194 1/2 working		2 1	3

If wrong answer, method marks as follows:

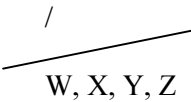
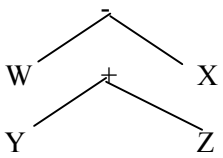
Basically here, if it is a little inaccurate, give 2 marks, if quite inaccurate but slightly correct give 1.

exponent 2^8 clearly identified	1	
application of shift / $*2^8$ from correct start point	1	
correct interpretation of bits	1	
	max	2

(c)	(i)	Processing fixed point numbers is quicker than floating point / less processing required; More accurate/greater precision;	1		
	(ii)	Where the possible range of numbers to be stored is limited / small; Where number is of a set format / processing integers / Working with currency; Where maximum precision is required	1	2	
				Total	7

5 (a) Needs a specific device/ resource; *1 mark for an example or 1 mark for generic resource: input device / output device / memory / backing store / user input*
Interrupt being serviced / interrupted from a higher priority process;
Time slice used up / waiting for processor time /waiting for next time slice;
1 mark for each of 2 reasons to max: 2

(b)	Concepts:	Threads share unprotected data; Processes are self contained;	2		
		Threads share more of their environment with each other than do processes under multitasking; There is very little protection of one thread from another, in contrast to multitasking; Threads may be distinguished only by the value of their program counters and stack pointers;; while sharing a single address space and set of global variables.;	2		
		<i>1 mark for each of 2 points to max:</i>	2		
				Total	4

6	(a)	Head (Tail (Days)) = Mon	R [Mon], MON	1	
		Tail([Head(Days)]) = []		1	
		Empty(Tail(Tail(Tail(Days))))=False		1	3
	(b)	[Elements in a list can only be <u>accessed sequentially</u> ; [elements in an array can be <u>accessed directly</u> ; [using the subscript; Any 2 points to max			2
			Total		5
7	(a)	(Technique whereby) hard disk is used; A secondary storage, hard (disk) drive	R backing storage		
		(to supplement) <u>main</u> memory when it is not large enough; A primary memory, RAM for the execution of a process / processes; A program			3
	(b)	Memory is (conceptually) divided into a number of fixed sized pages / page frames; A segments The (virtual address space of a) program / process is divided into fixed size pages; (Two different sorts of) pages are the same size; Page table indicates which pages of a process are loaded and where; <u>Pages</u> are loaded as required; <u>Pages</u> are copied out of main memory before being overwritten; Can carry forward/back 1 mark for each of 3 points to max:			3
			Total		6
8	(a)	root, branch . leaf node <i>must circle!</i>		1 1 1	
	(b)	left sub-tree		1 1	
	(c)	W-X / Y+Z 1 1 1 A column vector <i>Spurious punctuation</i>		3 -1	
			Total		8

9	(a) The set / list of bit patterns / binary codes representing machine operations; The set / list of bit patterns / binary codes for which machine operations have been defined; The collection of different operations available; A commands R interpreted, R A set / collection etc	1	1
	(b) 64 or 2^6	1	1
	(c) (i) immediate: operand field contains datum to be operated on;	1	
	(ii) direct: operand field contains address of datum to be operated on;	1	
	(iii) indirect: operand field contains a memory address; The content of the location within this memory address is the address of the datum; R if describing indexed //operand is the address; of the address of the data;	1 1 1 1	4
	(d) (i) B3 = 1011 0011	1	
	(ii) 62 C1 B2 AB <i>1 for operator, 1 for operand for each statement</i> <i>If extra 'field' in line, lose both marks</i>	2 2	5
	(e) (i) $255 / 2^8 - 1 / FF_{16}$ A FF, 11111111 ₂ ;		1
	(ii) $65535 / 64k - 1 / 2^{16} - 1 / FFFF_{16}$;; FFFF	2 1	3
	Total		14

10	(a)	(i)	Any from clauses 1 – 7	1	
		(ii)	Any from clauses 8 – 13	1	2
	A		clause number		
	(b)	(i)	valid;	1	
		(ii)	Valid;;	1	2
	(c)		<i>Must be at least 1 extra rule (see below)</i>		
			correct definition of a new noun_phrase and a new sentence	1	
			IF, AND in upper case	1	
			Variables in upper case	1	
			Descriptors in lower case	1	
			Logic	2	6
			<i>Suggested:</i>		
			noun_phrase(X,Y) IF adjective(X) AND noun(Y)		
			sentence(A,B,C,D,E) IF noun_phrase(A,B) AND verb(C) AND noun_phrase(D,E)		
			Total		10