



ASSESSMENT and
QUALIFICATIONS
ALLIANCE

Mark scheme January 2002

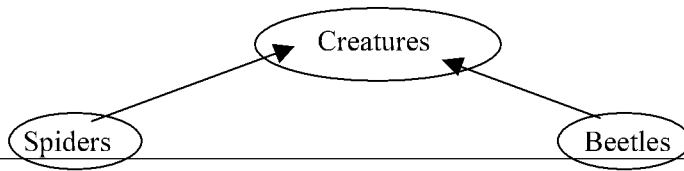
GCE

Computing

Unit CPT4

- ; – means a single mark
- A – means acceptable creditworthy answer
- R – means reject answer as not creditworthy

1a Diagram



b	<i>1 for position, 1 for correct arrows. Circles not necessary</i>	2	
	<i>OK if completely upside down.</i>		
	<i>e.g. number of legs, colour, web type;</i>	1	
	<i>Property</i>		
	<i>Method</i>	<i>Spin web/eat;</i>	1 4
	<i>R instance of property, e.g. 8 legs</i>		
	<i>Does not have to be biologically correct but sensible!</i>		

		1	
2a	<i>Clock speed</i>	<i>The frequency at which a clock pulse occurs;</i>	
		<i>R pulse/cycle period.</i>	1 2
b		<i>R frequency of fetch execute cycle</i>	
		<i>Increasing the clock speed will increase the speed at which instructions are executed.</i>	

3	<i>Any 3 from:</i>			
	PC/SCR	Address of next instruction;	To be fetched;	
	MAR	Address of data &/or instructions;	That are to be read from (main) memory;	
	MBR / MDR	Data &/or instruction;	Read from (main) memory;	
	IR/CIR	Holds current instruction;	While it is being decoded and executed;	9
		<i>Correct name/acronym required. Accept other correct 'Further details' – but must refer to role of register being described. May be incorporated in 'what stored' and carried forward.</i>		

4a	<i>Information specified by JCL</i>	User ID; Beginning and end of job; Peripherals required; Software required; Files needed; On error; Accounting information; Priority/importance of job; Disc space; Memory allocation; Max processing time allowed; Number of printed pages allowed; Dead line for job; Time of day (e.g. overnight); Specifying precisely when job to be run; Other;	<i>Length, size, time must be qualified. Must all describe job environment.</i>	2
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b	<i>IORATE</i>	To assign priorities to programs ; Ready for scheduling; To maximise use of system resources / processor; Balance I/O and processor bound jobs in system; to maximise throughput; to minimise turnaround time; to cut off a program that is in a loop;	<i>to max</i>	3	5
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5a	<i>Client –server system</i>	A server provides services required by client workstations/ applications;	1	
		Such as file storage/communications/web access; (<i>dependant on first point</i>)	1	
		OR	1	
		Server distributes data to client system requesting it;	1	
		Clients process data;.		
b	<i>3 benefits</i>	Client workstations can have lower processing speeds/hard disc capacity – and so cheaper;		
		A print server will manage the printing on behalf of the clients;		
		All client workstations can share 1 copy of an application;		
		All client workstations can share data/backups easier;		
		Enables greater security such as access rights/control over Internet access/firewall/one Internet access point;		
		Upgrades easily managed because only one copy of software;		
		Licensing managed because use can be monitored.	3	5
6a	<i>Interrupts</i>	A <u>signal</u> from a device <u>seeking the attention of the processor</u> ;	1	
b		Processor tests for presence of an interrupt at end of each instruction cycle/Identify source of interrupt;		
		Priority of interrupt assessed/interrupts of lower priority disabled/higher priority interrupts handled first;		
		Current state saved;		
		Processor suspends execution of current program;		
		Disable interrupt (<i>if not given earlier</i>)/interrupt vector masked;		
		Control transferred to appropriate interrupt service routine;		
		State and control restored to interrupted process when interrupt dealt with;	3	4

7a	79	Valid	Clause i, iii, iv, v; <i>1 mark for 2 correct, 2 marks for 4 correct, if 5 or 6 given, 0 marks</i>	3	
	148.5	Invalid	There is no provision for a decimal point in the rules/fails all 6 clauses;	2	
	-2003598	Valid	Clause i, ii, iii, iv, vi; <i>1 mark for 3 correct, 2 marks for 5 correct; if all 6 given, 0 mark</i>	3	
b		Decimal point (.);		1	
		Number IF integer AND decimal point AND integer/		1	
		Number if sign AND integer AND decimal point AND integer;		2	
		OR			
		Number if integer AND . AND integer;		1	
		<i>Also acceptable:</i>			
		Fraction (.5);		1	
		Number IF sign AND integer AND fraction;		1	10
8a	<i>Mantissa</i>	Significant digits/precision/answer by example;		1	
	<i>Exponent</i>	Power of 2 by which mantissa is to be multiplied to get original value/How many places the point has to move/answer by example; R decimal point		1	
bi		Mantissa ↓ 0110101100 000011	Mantissa identified	1	
ii		Msb/leftmost bit/starts with determines sign of number;		1	
		0 so +ve &/or 1 if -ve.		1	
c		<u>Convert -3 into 2's complement;</u>	0000 0011		
		<u>Add to 2's complement value of +5;</u>	1111 1101;		
		<i>If 3-5 calculated correctly give 1 method mark</i>	<u>0000 0101 +</u>	2	
			0000 0010;		
d		Increased range that can be stored in a given number of bits;		1	8
9a	i.	99;	145		
	ii	99+145 =244; <i>ecf</i>	145	3	
	iii	244+ 256 = 500			
b		109		1	4

10a	<i>Tail(Ports)</i>	[Barcelona, Athens, Alexandria, Tunis, Lisbon] <i>square brackets needed</i>	1
	<i>Head(Tail(Tail(Ports)))</i>	Athens	2
		[Athens]	1
	<i>Empty(T(T(T(T(T(T(Ports)))))))</i>	True	2
		True []	1
		[True]	0
b	<i>Recursively defined</i>	A definition which is defined in terms of itself/contains within its body a reference to itself/calls itself ; <i>A re-entrant; (In specimen papers 2001/2, but refers specifically to a procedure)</i>	1
c	<i>Stack necessary</i>	The state of the machine/contents of appropriate registers/ return address // saved each time the procedure is called; and retrieved in reverse order from the stack as control is progressively returned; OR different value of parameters /local variables; must be available each time procedure is called; OR P must be re-entrant (<i>In specimen papers 2001/2</i>)	1 1 1 2
d		Lisbon first; Southampton last; All 6 in order No punctuation; i.e. Lisbon Tunis Alexandria Athens Barcelona Southampton;	1 1 1 1 4
e	1	Southampton	5
	2	Barcelona	6
	3	Athens	2
	4	Alexandria	3
	5	Tunis	0 - terminator
	6	Lisbon	1
			2

Head Pointer
4