



ASSESSMENT and
QUALIFICATIONS
ALLIANCE

Mark scheme January 2003

GCE

Computing

Unit CPT1

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Unit 1: Computer Systems, Programming and Network Concepts

The following notation is used in the mark scheme:

- ; means a single mark;
- / means alternative response;
- **A** means acceptable creditworthy answer;
- **R** means reject answer as not creditworthy;
- **I** means ignore;
- **BoD** means benefit of doubt.

1.	(a)	(i)	electrical/electronic/physical components/parts of computer; I any example I ' ... can touch ... '	1
		(ii)	programs/sequences of instructions (which run on the hardware); A code; R application	1
	(b)		software;	1
	(c)		hardware;	1
			A correct term circled; R abbreviations	
			Total	4
2.	(a)	(i)	23;	1
		(ii)	17;	1
	(b)	(i)	1010 0001;;	
			<i>one mark for correct ASCII code, one mark for odd parity bit (follow through)</i>	2
		(ii)	11010 00010 <i>OR</i> 01010 00011 <i>OR</i>	
			<i>allow stop bit to be 1 or 0 but <u>stop and start bits must be different</u></i>	
			<i>follow through if (i) wrong</i>	
			01000 01011 <i>OR</i> 11000 01010; <i>Allow both ways round for transmission</i>	1
			Total	5

3. (a) network adapter/network (interface) card/Ethernet card;
A a named card type eg Token Ring Card; **R** NIC *on its own* **I** hub **1**
- (b) (i) **A**=Ring (network); **B**= Bus (network); **2**
- (ii) higher transmission rates possible with high traffic/performance of B degrades with heavier traffic;
R quicker no collisions; **A** fewer collisions;
transmission of messages is simple (as messages travel in one direction only); **max 1**
- (iii) easy/inexpensive to install;
easy to add more stations/computers/nodes/clients without disrupting network;
R users instead of node
R cable breaks, **R** computer breaks **max 1**
- (c) (i) a protocol is a set of rules; **A** set of procedures; **A** a rule;
I other terms unless talked out in rest of sentence 1
- (ii) to ensure successful communication/transmission/interaction;
(between different computers)
answer must imply communication/receiving data not hardware linking
R sending data only R if connection only 1
- Total 7**

4. (a) 1 – main memory;
 2 – processor; **A** CPU;
 3 – I/O port;
 4 – address bus;
 5 – control bus;

R anything else

5

- (b) (i) (processor) executes instructions; **R** data **R** programs

BoD ‘executes data and instructions’;

(main memory) stores program/data currently in use;

A temporary storage of data/programs; **R** information **R** application

(secondary storage) holds programs/data/files for long-term/non-volatile storage;

R application **I** virtual memory

A permanent storage of data/programs **R** information **R** backup

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- (ii) clock/timing; reset; interrupt ACK; interrupt request; bus grant; bus request;

status; I/O write; I/O read; Memory read; memory write; transfer ACK;

A interrupt; **A** transfer request; **A** examples
read/write on its own not enough

max 2

- (iii) instruction(s); address(es);

max 1

Total 11

5.	(a)	(i)	<u>Const Max = 200;</u>	1
		(ii)	<u>EndOfList := False / Ptr := 1 / EndOfList := True / Ptr := Ptr + 1;</u> <i>accept without :</i>	1
		(iii)	<u>If Ptr > Max Then / If EndOfList (Then)</u> ;	1
		(iv)	While WantedName <> Member[Ptr].Name And Not EndOfList Do ...; A While End While;	1
	(b)	(i)	Tmember; A (Type) Tmember = Record;	1
		(ii)	WantedName; A WantedName: String; R <i>whole line</i>	1
		(iii)	EndOfList; A (Var) EndOfList: Boolean;	1
	(c)		when the programmer wants to change the value it only needs changing in the declaration; can't be changed accidentally/by the program; easier to understand/debug program; A less error prone; R easier to read;	1
	(d)	(i)	because the age would need to be manually updated when it's someone's birthday; A an answer which implies age changes value; I lack of accuracy	1
		(ii)	store the date of birth and calculate the age from that and today's date; A date of birth <i>on its own</i>	1
	(e)		TRUE and FALSE / 1 and 0 / 0 and -1 / on and off / Yes and No / high and low;	1
			Total	11

6. (a) picture is broken into a grid of pixels; **A** diagram; **R** dots **R** parts **R** screen
for each pixel a number/value is stored; in memory;
- number/value represents a colour; **R** *black/white answers* **max** **2**
- (b) the graphic can be enlarged/reduced/zoomed in/out without distortion;
can take up much less (memory) space / smaller file size;
image is more accurate; smooth edges/lines; can produce 3D images; **max** **1**
- Total** **3**
7. (a) the number of times the amplitude is measured per second/unit of
time/sampling rate;
- the number of bits available to store the amplitude measurement/sampling
resolution;
- R** amount of memory **R** bits per second
- R** *all other factors* **R** *references to playback only* **2**
- (b) editing out noise/wrong notes post processing; sounds/data can be changed/
edited;
stored/transmitted digitally; **I** compression **1**
- (c) producing/creating/generating audio signals/sound(s) by computer/digitally;
(which sound like an instrument/voice) **1**
- R** editing/changing
- Total** **4**
8. (a) (i) direct;
- (ii) indirect; **2**
- (b) data is encoded information;; data is numbers / characters without meaning;
data is raw facts; something submitted for processing; data is input/stored;
information is output;
information is meaningful/useful/processed/analysed data;;
A information = data + structure;; **max** **2**
- Total** **4**

9. (a) (i) a compiler translates the whole source code;
into object code; **A** machine code (instructions); **A** executable file;~
if implied that compiler executes then talked out **max** **1**
- (ii) Interpreter translates line by line; as it executes/runs;
if object code created then talked out **max** **1**
- (b) (i) use compiler when execution should run as fast as possible;
when development is finished; when giving program to end user to run;
to protect source code from end user interference;
to turn program without translator/compiler on computer; **max** **1**
- (ii) use interpreter during
development time/testing/debugging/finding/correcting mistakes;
to support platform independence;
(e.g. Java → bytecode, bytecode interpreted) **max** **1**
- (c) assembler translates assembly/low level program;
compiler translates high level program;
assembler maps 1:1; compiler maps 1:many; **max** **1**
- Total** **5**

10. (a)

Ptr	Temp	List									
		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
		43	25	37	81	18	70	64	96	52	4
1	43	25	43								
2	43		37	43							
3											
4	81				18	81					
5	81					70	81				
6	81						64	81			
7											
8	96								52	96	
9	96									4	96
10											

ignore Ptr & Temp columns

1 mark for each of rows 1, 2, 4, 5, 6, 8, 9

7

(Final list 25, 37, 43, 18, 70, 64, 81, 52, 4, 96)

- (b) control will pass to the instruction after Endwhile;
 /the instruction/command/statement after Endwhile will be executed;
 program will exit while-block; loop stops;
A algorithm stops; **R** program stops;

max 1

- (c) (i) 25; *if part (a) not fully correct allow follow through: or lower of [1] & [2]*

- (ii) 81; *only allow follow through mark if the list at the end of part(a) is still a partially sorted list*

- (iii) 96; *must be 96 in all cases*

3

Total 11