



**2014 Computing**

**Advanced Higher**

**Finalised Marking Instructions**

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## **Part One: General Marking Principles for: Computing Advanced Higher**

This information is provided to help you understand the general principles you must apply when marking candidate responses to questions in this Paper. These principles must be read in conjunction with the specific Marking Instructions for each question.

- (a)** Marks for each candidate response must always be assigned in line with these general marking principles and the specific Marking Instructions for the relevant question. If a specific candidate response does not seem to be covered by either the principles or detailed Marking Instructions, and you are uncertain how to assess it, you must seek guidance from your Team Leader/Principal Assessor.
- (b)** Marking should always be positive ie, marks should be awarded for what is correct and not deducted for errors or omissions.

### **GENERAL MARKING ADVICE: Computing Advanced Higher**

The marking schemes are written to assist in determining the “minimal acceptable answer” rather than listing every possible correct and incorrect answer. The following notes are offered to support Markers in making judgements on candidates’ evidence, and apply to marking both end of unit assessments and course assessments.

## Part Two: Marking Instructions for each Question

### Section I

#### Software Development & Developing a Software Solution

Question		Expected Answer(s)	Max Mark	Additional Guidance
1	a	<p>Scope defines what a project must cover. (1 mark)</p> <p>Boundaries defines what the project will not cover. (1 mark)</p>	2	
	b	<ul style="list-style-type: none"> <li>Enabled different sub-tasks to be assigned to different members of the team.</li> <li>Allows timings for each task to be identified and related to the time available for the project.</li> <li>Allows sub-tasks which can be done concurrently to be identified.</li> <li>Any other.</li> </ul> <p>1 mark for each of 2 points.</p>	2	
	c	<ul style="list-style-type: none"> <li>Security surrounding some personal information could be an issue with the noticeboard (Data Protection Act).</li> <li>Members of the group may use copyright material in their advertisements (Copyright Designs &amp; Patents Act): Other references are appropriate eg Could register the group logo.</li> <li>It is unlawful to discriminate against people in respect of their <u>disabilities</u> in relation to the provision of goods and services eg on the noticeboard. (Disability Discrimination Act (1995) replaced by Equality Act 2010).</li> </ul> <p>1 mark for each of 2 points.</p>	2	

Question			Expected Answer(s)	Max Mark	Additional Guidance
1	d	i	<ul style="list-style-type: none"> <li>• Speech synthesis to read out page content for people with failing eyesight.</li> <li>• Careful choice of colours to make for good contrast.</li> <li>• Use hotspots rather than hyperlinks where possible to give a bigger target area.</li> <li>• Any other valid point.</li> </ul> <p>1 mark for each of 2 points.</p> <p>Note: 'large fonts' by itself is insufficient.</p>	2	
		ii	<ul style="list-style-type: none"> <li>• Hearing impairment. <ul style="list-style-type: none"> <li>– Sub-titles on any video clips.</li> <li>– Any other valid.</li> </ul> </li> <li>• Dexterity impairment eg arthritis in fingers. <ul style="list-style-type: none"> <li>– Use hotspots rather than hyperlinks where possible to give a bigger target area.</li> <li>– Any other valid.</li> </ul> </li> <li>• Any other valid impairment with an appropriate HCI feature.</li> </ul> <p>1 mark for impairment. 1 mark for appropriate HCI feature.</p>	2	
		e	<ul style="list-style-type: none"> <li>• Automatic generation of code from design language.</li> <li>• Automatic data modelling/schema.</li> <li>• Automatic user documentation.</li> <li>• Any other valid.</li> </ul> <p>1 mark for each of 2 points.</p>	2	

Question		Expected Answer(s)	Max Mark	Additional Guidance	
1	f	<ul style="list-style-type: none"> <li>• Users home computers will have many different setups, eg operating systems, browsers, applications.</li> <li>• Members selected will be likely to have computer builds representative of what most members will have.</li> <li>• Any other valid.</li> </ul> <p>1 mark for one valid point.</p>	1		
	g	i	Needs to be sorted.	1	
		ii	<p>Mid-point of list is identified, password compared to this value. (1 mark)</p> <p>Depending on whether password value &lt; mid-point or &gt;mid-point, useless half of list is discarded. (1 mark)</p> <p>Continued until password is found, if it is in the list. (1 mark)</p>	3	
	h	<p>Suitable examples of perfective maintenance :</p> <ul style="list-style-type: none"> <li>• A 'contact us' feature.</li> <li>• On-line registration to join the group.</li> <li>• A diary/calendar to be added.</li> </ul> <p>Suitable adaptive maintenance :</p> <ul style="list-style-type: none"> <li>• A change in the user interface to suit other impairments that they didn't consider initially.</li> <li>• Change it to suit newer browsers.</li> </ul> <p>Suitable corrective maintenance :</p> <ul style="list-style-type: none"> <li>• Some links don't work.</li> <li>• Some video clips don't play.</li> </ul> <p>Any other suitable examples relating to this website.</p> <p>1 mark for each of 2 examples.</p>	2		

Question		Expected Answer(s)	Max Mark	Additional Guidance
2	a	board (4,4).	1	
	b	<p>IF <u>board(3,4)='1'</u> and <u>board(4,4)='O'</u> then move is valid.</p> <p style="text-align: center;"> <span style="margin-right: 100px;">1 mark</span> <span>1 mark</span> </p> <p>1 mark for correct structure of IF ... and ... then.</p>	3	
	c	<pre> count_of_empty_cells = 0 for row = 1 to 7 do for column = 1 to 7 do if board[row,column]='O' then counter = counter +1 next column next row.</pre>	4	<p>1 mark for initialisation and incrementing the counter.</p> <p>1 mark for outer loop with termination.</p> <p>1 mark for inner loop with termination.</p>
	d	<ul style="list-style-type: none"> <li>• Replace jumped over peg by a blank.</li> <li>• Winning/losing splashscreen.</li> <li>• Background music.</li> <li>• Check for valid move.</li> <li>• Any other example.</li> </ul> <p>1 mark for any one point.</p>	1	

Question		Expected Answer(s)	Max Mark	Additional Guidance	
3	a	Record : Results  Horse Name : string; Entry number : integer Time : Real; Penalty points : real; Total points : real End;	3	1 mark for basic structure of record. 1 mark for all field names correct. 1 mark for all data types correct.	
	b	<b>Mention of :</b> <ul style="list-style-type: none"> <li>• Reference to start and termination of loop.</li> <li>• Finds minimum.</li> <li>• Transfers minimum value to second list.</li> <li>• Replaces minimum value in first list by dummy value.</li> </ul> 1 mark for each of any three points.	3		
	c	No effect. (1 mark)  All find minimums will still have to be done. (1 mark)	2		
	d	Memory N+1 compared to selection sort 2N/uses half as much memory. (1 mark)  Could be fewer comparisons since a bubble sort can terminate early/makes use of a partially sorted list. (1 mark)	2		
	e	i	Initialises the file and gets it ready to receive output from the program.	1	
		ii	Copies the data to the named external file.	1	
	f	Open file for writing Loop for 55 teams If results[counter].time>75 then write(filename, results) End loop Close file.	4	1 mark for open and close file. 1 mark for loop with termination. 1 mark for correct identification of time field in record. 1 mark for output to external file.	

Question		Expected Answer(s)	Max Mark	Additional Guidance
3	g	<p>A trace table lists all variables in the program and will show their values during each step of the execution of the program. (1 mark)</p> <p>A breakpoint is a marker set in the code which causes the execution of the program to pause. The program can be inspected at this point and then execution can be continued until the next breakpoint. (1 mark)</p>	2	



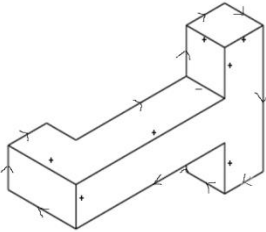
Question		Expected Answer(s)	Max Mark	Additional Guidance																											
4	a	Pointer is needed to identify the location at the current top of the stack (so that next stack access can be identified). (1 mark)	1																												
	b	i	2																												
		<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <td style="width: 10%;">Index</td> <td style="width: 10%;">0</td> <td style="width: 10%;">1</td> <td style="width: 10%;">2</td> <td style="width: 10%;">3</td> <td style="width: 10%;">4</td> <td style="width: 10%;">5</td> <td style="width: 10%;">6</td> <td style="width: 10%;">Stack pointer</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td style="border: 1px solid black; width: 40px; height: 20px; text-align: center;">2</td> </tr> <tr> <td></td> <td style="border: 1px solid black; width: 40px; height: 20px; text-align: center;">6</td> <td style="border: 1px solid black; width: 40px; height: 20px; text-align: center;">4</td> <td style="border: 1px solid black; width: 40px; height: 20px; text-align: center;">3</td> <td style="border: 1px solid black; width: 40px; height: 20px;"></td> <td style="border: 1px solid black; width: 40px; height: 20px;"></td> <td style="border: 1px solid black; width: 40px; height: 20px;"></td> <td style="border: 1px solid black; width: 40px; height: 20px;"></td> <td></td> </tr> </table> <p>1 mark for 3 in location 2. 1 mark for stack pointer changed to 2.</p>	Index	0	1	2	3	4	5	6	Stack pointer									2		6	4	3							
Index	0	1	2	3	4	5	6	Stack pointer																							
								2																							
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Index	0	1	2	3	4	5	6	Stack pointer																							
								0																							
	42																														
	c	<p>If stack is empty then</p> <p>output 'Stack empty' message (1 mark)</p> <p>else</p> <p>data item = value in stack location at top of stack (1 mark)</p> <p>decrement stack pointer by 1 (1 mark)</p> <p>end if</p>	3																												
	d	<ul style="list-style-type: none"> <li>Stack overflow.</li> <li>Trying to push a value onto a full stack.</li> </ul> <p>1 mark for one point.</p>	1																												

Question		Expected Answer(s)	Max Mark	Additional Guidance
5	a	Class is kettles (1 mark). Instances are Mybud Lime-O, VG2 etc(1 mark).	2	
	b	Object-oriented can use classes, sub-classes and inheritance to reduce the amount of data stored. (1 mark) As new data is added fewer additions need to be made in object-oriented. (1 mark)	2	
	c	All the information about a kettle can be written as a fact. (1 mark)	1	

[END OF SECTION I]

**Section II**

**Part A — Artificial Intelligence**

Question		Expected Answer(s)	Max Mark	Additional Guidance
6	a	<p>1 mark each for two of:</p> <ul style="list-style-type: none"> <li>• Rote learning.</li> <li>• Learning from advice.</li> <li>• Learning from experience.</li> <li>• Learning from examples/inductive learning.</li> <li>• Explanation –based learning.</li> <li>• Learning by discovery.</li> <li>• Learning by analogy.</li> </ul> <p>1 mark for matching description.</p>	4	
6	b		3	

Question		Expected Answer(s)	Max Mark	Additional Guidance										
7	a		4											
	b	<ul style="list-style-type: none"> <li>• Arrowed lines can be bi-directional.</li> <li>• Each node can only be represented once.</li> </ul>	1											
	c	Stuck at M (1). Since the successor node K has the same value or there is no better successor (1).	2											
	d	<table border="1"> <thead> <tr> <th>Nodes under consideration</th> <th>Node Selected</th> </tr> </thead> <tbody> <tr> <td>F,P</td> <td>F</td> </tr> <tr> <td>P,W,M</td> <td>M</td> </tr> <tr> <td>P, W,K</td> <td>K</td> </tr> <tr> <td>P,W,B</td> <td>B</td> </tr> </tbody> </table>	Nodes under consideration	Node Selected	F,P	F	P,W,M	M	P, W,K	K	P,W,B	B	2	1 mark 1 mark
Nodes under consideration	Node Selected													
F,P	F													
P,W,M	M													
P, W,K	K													
P,W,B	B													

Question			Expected Answer(s)	Max Mark	Additional Guidance												
7	e	i	A* algorithm.	1													
		ii	<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Nodes under consideration including Evaluation Function</th> <th>Node Selected</th> </tr> </thead> <tbody> <tr> <td>F [8], P[12]</td> <td>F</td> </tr> <tr> <td>P[12], M[8], W[10]</td> <td>M</td> </tr> <tr> <td>P[12], W[10], K[11]</td> <td>W</td> </tr> <tr> <td>P[12], K[11], L[10]</td> <td>L</td> </tr> <tr> <td>P[12], K[11], B[10]</td> <td>B</td> </tr> </tbody> </table>	Nodes under consideration including Evaluation Function	Node Selected	F [8], P[12]	F	P[12], M[8], W[10]	M	P[12], W[10], K[11]	W	P[12], K[11], L[10]	L	P[12], K[11], B[10]	B	3	1 mark 1 mark 1 mark
Nodes under consideration including Evaluation Function	Node Selected																
F [8], P[12]	F																
P[12], M[8], W[10]	M																
P[12], W[10], K[11]	W																
P[12], K[11], L[10]	L																
P[12], K[11], B[10]	B																
		iii	A* was AFWLB, route is 10.	1													

Question			Expected Answer(s)	Max Mark	Additional Guidance
8	a	i	Syntactic analysis.	1	
		ii	Hunting - could also be identified as a verb or as a noun (1). No marks for the word.	1	
	b	i	<ul style="list-style-type: none"> <li>NP -&gt; Determiner Noun.</li> <li>NP -&gt; Determiner Adjective Noun.</li> <li>Any other reasonable.</li> </ul>	1	
	b	ii	Must match answer to (i) eg the large house for bullet point 2.	1	
	c		To extract the meaning of a sentence.	1	
	d		<ul style="list-style-type: none"> <li>Pragmatic analysis – derives meaning but in context, resolves semantic ambiguity using context.</li> <li>Question could be – name and describe another stage.</li> <li>Speech recognition – digitises sound, identifies phonemes and combines to identify words.</li> </ul>	2	

Question			Expected Answer(s)	Max Mark	Additional Guidance
8	e	i	<ul style="list-style-type: none"> <li>H=dogs, T=[cats, girls, boys] Award 1 mark each.</li> </ul> <p>Note: H must not be a list; T must have brackets to indicate a list.</p>	2	
		ii	<ul style="list-style-type: none"> <li>Uses first member rule compares girls to the head of the list [dogs, cats, girls, boys] i.e. dogs which is not a match, fails.</li> <li>Uses second rule to identify if girls is a member of the tail [cats, girls, boys].</li> <li>Uses first rule to check if girls is the head of this list [cats, girls, boys] i.e. cats which is not a match, fails.</li> <li>Uses second rule to identify if girls is a member of the tail [girls, boys].</li> <li>Uses first rule to check if girls is the head of this list [girls, boys]. Succeeds reports :true/yes.</li> </ul> <p>1 mark each bullet.</p>	4	

Question		Expected Answer(s)	Max Mark	Additional Guidance									
9	a	<ul style="list-style-type: none"> <li>It uses the facts in working memory to find rules that can be fired.</li> <li>new facts are added to working memory by firing the rules.</li> <li>process repeated until a conclusion is reached.</li> </ul> <p>Any two (1) mark.</p>	2										
	b	i	1										
		ii	1										
		iii	2										
		iv	4										
		<table border="1"> <tr> <td>Fire rule 3 and add X</td> <td>Fire rule 1 and add L</td> <td rowspan="4">Other answer</td> </tr> <tr> <td>Fire rule 2 and add Y</td> <td>Fire rule 3 and add X</td> </tr> <tr> <td>Fire rule 1 and add L</td> <td>Fire rule 2 and add Y</td> </tr> <tr> <td>Fire rule 4 and output Z</td> <td>Fire rule 4 and output Z</td> </tr> </table> <p>1 mark each line.</p>	Fire rule 3 and add X	Fire rule 1 and add L	Other answer	Fire rule 2 and add Y	Fire rule 3 and add X	Fire rule 1 and add L	Fire rule 2 and add Y	Fire rule 4 and output Z	Fire rule 4 and output Z		
Fire rule 3 and add X	Fire rule 1 and add L	Other answer											
Fire rule 2 and add Y	Fire rule 3 and add X												
Fire rule 1 and add L	Fire rule 2 and add Y												
Fire rule 4 and output Z	Fire rule 4 and output Z												
	c	<p>CF conclusion= <math>\min(0.8, 0.9, 0.9) * 0.7</math>  <math>= 0.8 * 0.7 = 0.56</math></p> <p>Awards 1 mark for knowing to take minimum of conditions.  Awards 1 mark for multiplying by CF of the rule.</p>	2										
	d	<p>Dry run – stepping through code manually.</p> <p>Breakpoints – stopping execution of code of predefined point.</p>	2										



Question			Expected Answer(s)	Max Mark	Additional Guidance								
10	a	i	<table border="1"> <tr><td colspan="2">Mountain_bike</td></tr> <tr><td>has</td><td>two_wheels</td></tr> <tr><td>has</td><td>two_front_forks</td></tr> <tr><td>has</td><td>front_suspension</td></tr> </table>	Mountain_bike		has	two_wheels	has	two_front_forks	has	front_suspension	1	
		Mountain_bike											
	has	two_wheels											
	has	two_front_forks											
has	front_suspension												
ii	<table border="1"> <tr><td colspan="2">hardtail</td></tr> <tr><td>subclass</td><td>mountain_bike</td></tr> </table>	hardtail		subclass	mountain_bike								
hardtail													
subclass	mountain_bike												
iii	<table border="1"> <tr><td colspan="2">lefty</td></tr> <tr><td>instance</td><td>Hardtail</td></tr> <tr><td>has</td><td>one_front_fork</td></tr> </table>	lefty		instance	Hardtail	has	one_front_fork						
lefty													
instance	Hardtail												
has	one_front_fork												
b	<ul style="list-style-type: none"> <li>A default value is inherited by subclasses or instances unless overwritten by its own slot (1).ie the lefty has overwritten the default value of 2 forks for mountain bikes to 1 fork (1).</li> </ul>	2											
c	<ul style="list-style-type: none"> <li>Instance – single example of a class/subclass.</li> <li>Subclass – a group of objects which share characteristics.</li> </ul>	2											

Question		Expected Answer(s)	Max Mark	Additional Guidance
10	d	<ul style="list-style-type: none"> <li>• has(mountain_bike, two_wheels).</li> <li>• has(mountain_bike, two_front_forks).</li> <li>• has(mountain_bike, front suspension).</li> <li>• subclass(hardtail, mountain_bike).</li> <li>• subclass(full_suspension, mountain_bike).</li> <li>• subclass(downhill, full_suspension).</li> <li>• subclass(freeride, full_suspension).</li>   <li>• instance(lefty,hardtail).</li> <li>• instance(lector,hardtail).</li> </ul>	3	
	e	has(X,Y):- subclass(X,Z), has(Z,Y).	2 <b>(60)</b>	

[END OF SECTION II PART A]

**Section II**

**Part B — Computer Architecture**

Question			Expected Answer(s)	Max Mark	Additional Guidance
11	a	i	The way that the operand is used to reference the memory.	1	
		ii	The address is contained in the op-code so there is no operand.	1	
		iii	LDA#N (1) – immediate mode – operand is a value (1). OR LDX M/STA M (1) – direct mode – operand is an address in memory (1).	2	
	b	i	A 0 – 2 – 4 – 6 while X 3 – 2 – 1 – 0. (1 for each column correct + 1 for line numbers relate correctly).	3	
		ii	The code multiplies the values in Location 1 and Location 2 (1). And stores the result in Location 3 (1).	2	
		iii	X decrements in each loop (1). But A does not increase above 2. L3 will store 2 (1).	2	
		iv	Max value in Location 3 is 255 (1). So values in L1 and L2 must not give $L1 * L2 > 255$ (1).	2	

Question		Expected Answer(s)	Max Mark	Additional Guidance
12	a	Because of the nesting effect, what is required is first in, last out which is a stack structure (1). A queue would result in the values retrieved being in the wrong order.	1	
	b	PC (1).	1	

Question		Expected Answer(s)	Max Mark	Additional Guidance
13	a	<p>L1 cache is much more expensive than L2 cache. (1 mark)            To provide a very large single cache would increase price considerably. (1 mark)</p> <p><b>OR</b>            A single large cache results in a large time to find data (increased latency).(1 mark) which would lead to reduced performance.</p>	2	
13	b	<p>A search is made in L2 cache. If found, a block containing the data is transferred to L1 and the data read from there.(1). If a cache miss in level 2 occurs, a block containing the data is transferred from main memory to L2, (1). And a smaller block to L1 and the data read from there (1).</p>	3	

Question			Expected Answer(s)	Max Mark	Additional Guidance
14	a	i	When the instruction is executed, the operation is carried out on multiple data items <u>simultaneously</u> .	1	
		ii	With SIMD, a <i>block</i> of pixels are loaded to the SIMD registers (1). And the adding takes place on all of the pixels at once (1). This will be a much faster operation.	2	
	b	i	Each register can hold four 32 bit data items (1). 16 registers so improvement = $4 * 16 = 64$ (1).	2	
		ii	The calculation above does not take into account the time required to set up the registers before the operation and to store the data back to memory after the operation.	1	

Question		Expected Answer(s)	Max Mark	Additional Guidance
15	a	Every instruction can be fetched in one operation. OR The pipeline will be able to run smoothly.	1	
	b	Use of register oriented instructions means that there are fewer data transfers to/from main slower memory (1). The more registers, the better (1).	2	
	c	A small number of addressing modes.	1	
	d	The CPU looks ahead and executes any instructions which simply load data from memory (1). Storing it in GP registers. Data is then ready when required by the code (1).	2	
	e	Data flow analysis (1). The compiler scans the code looking for data dependency (1). And rearranges the code to try to reduce it as much as possible when executing (1).	3	

Question		Expected Answer(s)	Max Mark	Additional Guidance
16	a	Each processor has cache (1). And local RAM (1). Plus a shared main memory with all other processors (1).	2	
	b	Each processor requires an address (1). Packet switching then enables data to be sent along the fastest available route from one processor to another (1).	2	



Question			Expected Answer(s)	Max Mark	Additional Guidance
17	a	i	Eg providing a standard look and feel for applications (1). Reducing coding needed in applications (1).	2	
		ii	Eg open/save a file (any valid 1).	1	
		iii	Eg dealing with mouse clicks on icon (any valid 1).	1	
	b		Syntax is the method by which the operation is carried out (eg moving finger across screen) (1). Semantics is the result of the operation (i.e. moving forward one photo) (1).	2	
	c		The operating system is in control of the allocation of processing time to processes (1).	1	
	d		Round Robin – all processes get the same time slices and have to wait in the queue before being processed. (1). Multi-level feedback queue gives newly created tasks an immediate allocation of time (1). Thus short jobs are processed almost immediately and, if short enough, may complete before they reach the round robin level of the queue (1). This gives a responsive feel to the OS for the user interactions (1).	4	

Question		Expected Answer(s)	Max Mark	Additional Guidance	
18	a	Faster to save/retrieve files from the disk. (1). Less disk space is wasted on storing the locations of the clusters used for the file. (1)	2		
	b	A block of memory is used to map the state of each cluster on the disk (1). A used cluster may be represented by the value 1 and a free cluster may have the value 0. The OS can scan through this memory to find a large enough number of contiguous 0's to hold the file (1).	2		
	c	i	The hard disk has lots of small areas of free contiguous clusters that are not large enough to hold files (1).	1	
		ii	A 'Disk Full' error may occur when there is actually a large amount of free but unusable disk space available.	1	
		iii	Compaction of the disk space (files are moved so that there is no free space between them – this leaves a large block of free space at the end of the disk) (2 – either name + brief explanation or a very good explanation).	2	
		iv	The same amount of time.(1). The clusters are still contiguous so the time to read it will still be the same (1).	2	

[END OF SECTION II — PART B]

**Section II**

**Part C — Computer Networking**

Question			Expected Answer(s)	Max Mark	Additional Guidance													
19	a	i	<ul style="list-style-type: none"> <li>• New protocol has greater outdoor range than 802.11n, 250 metres.</li> <li>• New protocol has greater transfer rate than 802.11n, 150 Mbps.</li> <li>• Increasing the effectiveness/capacity of their wireless network.</li> </ul> <p>one mark for each point, including figures.</p>	3														
		ii	<ul style="list-style-type: none"> <li>• Lack of compatibility will mean customers have to replace all of their wireless equipment.</li> <li>• Single source of equipment results in limited choice of equipment and higher prices.</li> <li>• Proprietary protocols are less well supported by third party systems.</li> <li>• Any other appropriate point.</li> </ul> <p>one mark for each point, maximum of two marks.</p>	2														
	b	i	Data link layer.	1														
		ii	<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>OSI</th> <th>TCP/IP</th> </tr> </thead> <tbody> <tr> <td>Application</td> <td rowspan="3">Application</td> </tr> <tr> <td>Presentation</td> </tr> <tr> <td>Session</td> </tr> <tr> <td>Transport</td> <td>Transport</td> </tr> <tr> <td>Network</td> <td>Internet</td> </tr> <tr> <td>Data Link</td> <td rowspan="2">Network</td> </tr> <tr> <td>Physical</td> </tr> </tbody> </table> <p>one mark for OSI layers, one mark for TCP/IP layers, one mark for correct mapping.</p>	OSI	TCP/IP	Application	Application	Presentation	Session	Transport	Transport	Network	Internet	Data Link	Network	Physical	3	
OSI	TCP/IP																	
Application	Application																	
Presentation																		
Session																		
Transport	Transport																	
Network	Internet																	
Data Link	Network																	
Physical																		

Question		Expected Answer(s)	Max Mark	Additional Guidance
19	c	<ul style="list-style-type: none"> <li>• Technical feasibility, could the range and bandwidth be achieved with consumer radio transmitter and antenna technology.</li> <li>• Economic feasibility, will the cost of installing new equipment create cost savings.</li> <li>• Schedule feasibility. can the system be installed in time.</li> </ul> <p>one mark for each point, maximum of three marks.</p>	3	

Question			Expected Answer(s)	Max Mark	Additional Guidance
20	a	i	<ul style="list-style-type: none"> <li>• /22 at the end of the address indicates that 22 bits are used to represent the network.</li> <li>• Which leaves 10 bits that can be used to represent hosts on the network.</li> </ul> <p>one mark for each point, maximum of two marks.</p>	2	
		ii	<ul style="list-style-type: none"> <li>• 1024 IP addresses, from /22 CIDR address.</li> <li>• Less network and broadcast addresses.</li> </ul> <p>one mark for each point, award full marks for final answer of 1022.</p>	2	
		iii	<ul style="list-style-type: none"> <li>• Classful addressing would allocate a Class B network, or 65536 IP addresses.</li> <li>• Example CIDR address would only allocate 1024 addresses, thus allowing 64512 addresses to be allocated to other networks.</li> </ul> <p>one mark for each point.</p>	2	
	b	i	<p>Accept any one of the following points:</p> <ul style="list-style-type: none"> <li>• 255.255.255.128</li> <li>• 11111111.11111111.11111111.10000000</li> </ul> <p>one mark for first three octets, one mark for fourth octet.</p>	2	
		ii	<ul style="list-style-type: none"> <li>• Less network congestion.</li> <li>• Greater security, as traffic be limited to specific subnets.</li> </ul>	2	

Question			Expected Answer(s)	Max Mark	Additional Guidance
21	a	i	<p>UTP:</p> <ul style="list-style-type: none"> <li>• Bandwidth, 10 Mbps to 1 Gbps.</li> <li>• Range, up to 100 metres.</li> </ul> <p>Fibre optic:</p> <ul style="list-style-type: none"> <li>• Bandwidth, 10 Mbps to 10 Gbps.</li> <li>• Range, up to 3 Km.</li> </ul> <p>one mark for comparison of each feature, maximum of two marks.</p>	2	
	a	ii	<ul style="list-style-type: none"> <li>• UTP is lower cost for short distances.</li> <li>• Fibre optic will need far fewer repeaters to connect two remote sites.</li> <li>• Lower bandwidth required to connect individual devices within a network.</li> <li>• Higher bandwidth of fibre required to carry traffic of many devices between sites.</li> <li>• Greater security of fibre optic cable is useful between sites.</li> <li>• Where the school cannot control the physical access to the cabling.</li> </ul>	3	
	b	i	<p>Full backup: a copy of all files on computer is made.</p> <p>Differential backup: a copy of all the files that have been modified since the last full backup.</p> <p>Incremental backup: a copy of all the files that have been modified since the backup of any kind.</p>	3	
		ii	<ul style="list-style-type: none"> <li>• Full backup each Sunday.</li> <li>• Differential backup after each school day.</li> <li>• Incremental backups each hour between other backups.</li> <li>• Or other appropriate point.</li> <li>• One mark for each point, maximum of three marks.</li> </ul> <p>other equivalent schedules may be appropriate.</p>	3	

Question			Expected Answer(s)	Max Mark	Additional Guidance
21	c	i	<ul style="list-style-type: none"> <li>Number of images/frames taken by the video camera each second.</li> </ul>	1	
		ii	<ul style="list-style-type: none"> <li>Greater frame rate will result in more data to be processed and transmitted over the network.</li> <li>Larger amount of data will require extra processing resources for encoding/compression.</li> </ul>	2	
		iii	<ul style="list-style-type: none"> <li>Both ends of the communication generate a private/public key pair.</li> <li>The data is encrypted using the recipient's public key.</li> <li>After transmission, the data is decrypted using the recipient's private key.</li> </ul>	3	

Question			Expected Answer(s)	Max Mark	Additional Guidance
21	d	i	<ul style="list-style-type: none"> <li>An individual IP address (or range of addresses) can be specifically allowed access to the network.</li> <li>A particular port (or range of ports) or protocol/service can be blocked from accessing the network.</li> </ul>	2	
		ii	<ul style="list-style-type: none"> <li>Proxy can make requests on behalf of all network clients (1 mark). Allowing single Internet connections to be shared between clients. (1 mark)</li> <li>Resources retrieved by the proxy can be cached (1 mark). Allowing subsequent requests from other clients to be processed quicker. (1 mark)</li> <li>Traffic passing through the proxy can be filtered (1 mark). Allowing malicious or inappropriate content to be blocked from entering in the network. (1 mark)</li> <li>Network Address Translation. (1 mark) can hide the internal network addresses from the remote server (1 mark). Or can allow for private IP address ranges to be used on the intranet while using only a single external IP address. (1 mark)</li> </ul> <p>two marks for each point, maximum of two features described.</p>	4	
		iii	<ul style="list-style-type: none"> <li>A gateway (1 mark). Allows internal servers to provide an external service without being directly connectable (1 mark).</li> <li>A tunnel (1 mark). Secure access to the network from a remote location as if locally connected (1 mark).</li> </ul> <p>marks can only be awarded for discussion of a single intermediate.</p>	2	



Question			Expected Answer(s)	Max Mark	Additional Guidance
21	e		<ul style="list-style-type: none"> <li>• Data Protection Act <i>Accept any one of the following explanations:.</i></li> <li>• They will have had to protect their pupil data files to ensure that details cannot be accessed by others.</li> <li>• They will have to ensure that they only collect relevant data about their pupils.</li> <li>• Any other appropriate.</li> </ul>	2	

Question			Expected Answer(s)	Max Mark	Additional Guidance
22	a	i	<pre>&lt;style type="text/css"&gt; p {   colour:blue; } &lt;/style&gt;</pre> <p>one mark for style tag pair, one mark for use of paragraph, one mark for setting colour.</p>	3	
		ii	<ul style="list-style-type: none"> <li>• A single stylesheet can be shared by multiple web pages.</li> <li>• Updating the stylesheets applies the change to all web pages.</li> <li>• Without stylesheets, font and colour changes would need to be applied individually to all tags on each web page.</li> </ul> <p>one mark for each point, maximum of two marks</p>	2	
	b	i	<ul style="list-style-type: none"> <li>• Java applets run within a memory protected sandbox.</li> <li>• Java applets can be viewed on multiple operating systems and browsers.</li> </ul>	2	
		ii	<p>If the expected user base is well defined, and known to be limited to users of Microsoft Windows, it may be more appropriate to use ActiveX.</p>	1	

Question			Expected Answer(s)	Max Mark	Additional Guidance
22	c	i	<p><i>Accept one of the following:</i></p> <ul style="list-style-type: none"> <li>• QuickTime.</li> <li>• Real Player.</li> <li>• Adobe Flash.</li> <li>• Any other appropriate.</li> </ul>	1	
		ii	<p><i>Accept one of the following:</i></p> <ul style="list-style-type: none"> <li>• Web browser does not include code to render video/multimedia content.</li> <li>• Web browser might not be able to render some file formats.</li> <li>• Any other appropriate.</li> </ul>	1	
		iii	<p><i>Accept one of the following:</i></p> <ul style="list-style-type: none"> <li>• Web browser has been written to include code to render the video format.</li> <li>• Web browser is distributed with some default plug-ins, including one to display the video format.</li> <li>• Any other appropriate.</li> </ul>	1	
				(60)	

[END OF SECTION II — PART C]

[END OF MARKING INSTRUCTIONS]