

Mark Scheme (Results)

Summer 2016

GCSE Computer Science (1CP0/01)
Paper 1: Principles of Computer Science

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Summer 2016

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General Marking Guidance

- All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.
- Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.
- Examiners should mark according to the mark scheme not according to their perception of where the grade boundaries may lie.
- There is no ceiling on achievement. All marks on the mark scheme should be used appropriately.
- All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e. if the answer matches the mark scheme. Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.
- Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.
- When examiners are in doubt regarding the application of the mark scheme to a candidate's response, the team leader must be consulted.
- Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.

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Question Number	Answer	Additional Guidance	Mark
1 (a) (i)	Any one of: <ul style="list-style-type: none"> • To allow connected machines to communicate • To provide the rules of communication between two networked devices 	Any other response indicating communication	1

Question Number	Answer	Additional Guidance	Mark
1 (a) (ii)	Any one of: <ul style="list-style-type: none"> • Backbone • Connecting backbone • Internet backbone • Fibre backbone • Network backbone 		1

Question Number	Answer	Additional Guidance	Mark
1 (a) (iii)	Ring		1

Question Number	Answer	Additional Guidance	Mark																				
1(a)(iv)	<p>One mark for each correct cell.</p> <table border="1"> <thead> <tr> <th>LAN</th> <th>WAN</th> <th>PAN</th> <th>VPN</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td>X</td> <td></td> </tr> <tr> <td>X</td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td>X</td> </tr> <tr> <td></td> <td>X</td> <td></td> <td></td> </tr> </tbody> </table>	LAN	WAN	PAN	VPN			X		X							X		X				4
LAN	WAN	PAN	VPN																				
		X																					
X																							
			X																				
	X																						
Question Number	Answer	Additional Guidance	Mark																				
1(b)(i)	<p>Any one of:</p> <ul style="list-style-type: none"> To keep information private/secure/secret as it is being transmitted across networks So that unauthorised persons will not be able to translate/understand the transmitted data 	<p>Do not accept:</p> <ul style="list-style-type: none"> to keep secure when stored on devices, which is not the context of the question 	1																				

Question Number	Answer	Additional Guidance	Mark									
1(b)(ii)	<table border="1"> <thead> <tr> <th data-bbox="405 344 804 384">Plain Text</th> <th data-bbox="804 344 1050 384">Shift</th> <th data-bbox="1050 344 1426 384">Cipher Text</th> </tr> </thead> <tbody> <tr> <td data-bbox="405 384 804 461">digit</td> <td data-bbox="804 384 1050 461">+3</td> <td data-bbox="1050 384 1426 461">gljlw</td> </tr> <tr> <td data-bbox="405 461 804 537">binary</td> <td data-bbox="804 461 1050 537">-2</td> <td data-bbox="1050 461 1426 537">zglypw</td> </tr> </tbody> </table>	Plain Text	Shift	Cipher Text	digit	+3	gljlw	binary	-2	zglypw		2
Plain Text	Shift	Cipher Text										
digit	+3	gljlw										
binary	-2	zglypw										

Question Number	Answer	Additional Guidance	Mark
1(c)(i)	1 0 0 1 0 1 0 1		1

Question Number	Answer	Additional Guidance	Mark
1(c)(ii)	6 E	Ignore case	1

Question Number	Answer	Additional Guidance	Mark
1(c)(iii)	1 1 0 0 0 1 0 0	Ignore spacing Must be 8-bits	1

Question Number	Answer	Additional Guidance	Mark
1(c)(iv)	Any one of: <ul style="list-style-type: none"> • 2^n and $n=8$ • 2^8 • $2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2$ • $2^4 \times 2^4$ • $2^2 \times 2^2 \times 2^2 \times 2^2$ • Any other appropriate formula giving a result of 256 		1

Question Number	Answer	Additional Guidance	Mark
1 (d) (i)	Any one of the following: <ul style="list-style-type: none"> • Data is permanently lost (during the compression process) • Resolution is lost in images, (usually where it will not be noticed by the human eye) • Signal is degraded in audio files, (usually not noticeable to the human ear) 	Accept answers that indicate a loss of quality	1

Question Number	Answer	Additional Guidance	Mark
1 (d) (ii)	Any one of: B = JPEG		1

Question Number	Answer	Additional Guidance	Mark
1(e)	One mark for each of: <ul style="list-style-type: none"> • X-Dimension = 2 • Y-Dimension = 3 Examples: <ul style="list-style-type: none"> • (2,3) • X=2, Y=3 	Values of 2 and 3 alone, with no indication of ordering, cannot be awarded. Accept any other notation clearly indicating (x,y) ordering and values	2

(Total for Question 1 = 18 marks)

Question Number	Answer	Additional Guidance	Mark												
2(a)	<table border="1"> <thead> <tr> <th>EU Cookie Law (e-Privacy Directive)</th> <th>Computer Misuse Act</th> <th>Copyright, Designs, and Patents Act</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td>X</td> </tr> <tr> <td></td> <td>X</td> <td></td> </tr> <tr> <td>X</td> <td></td> <td></td> </tr> </tbody> </table>	EU Cookie Law (e-Privacy Directive)	Computer Misuse Act	Copyright, Designs, and Patents Act			X		X		X				3
	EU Cookie Law (e-Privacy Directive)	Computer Misuse Act	Copyright, Designs, and Patents Act												
			X												
		X													
X															

Question Number	Answer	Additional Guidance	Mark										
2(b)(i)	<table border="1"> <thead> <tr> <th>High-Level Programming Language</th> <th>Low-Level Programming Language</th> </tr> </thead> <tbody> <tr> <td>X</td> <td></td> </tr> <tr> <td></td> <td>X</td> </tr> <tr> <td>X</td> <td></td> </tr> <tr> <td></td> <td>X</td> </tr> </tbody> </table>	High-Level Programming Language	Low-Level Programming Language	X			X	X			X		4
	High-Level Programming Language	Low-Level Programming Language											
	X												
		X											
X													
	X												

Question Number	Answer	Additional Guidance	Mark
2(b)(ii)	Comment(s) / Annotation(s)	Do not penalise spelling	1

Question Number	Answer	Additional Guidance	Mark
2(b)(iii)	cubeNum	Do not penalise spelling Do not award if other information from function header is provided because the question asks for name only.	1

Question Number	Answer	Additional Guidance	Mark
2(b)(iv)	Any one of: <ul style="list-style-type: none"> • 18 to 22 • 18 - 22 • 18, 19, 20, 21, 22 • 18, 20, 22 	Entire range must be provided Award any discernible notation	1

Question Number	Answer	Additional Guidance	Mark
2(b)(v)	Any one of: <ul style="list-style-type: none"> • 25 • 27 		1

Question Number	Answer	Additional Guidance	Mark
2(b)(vi)	Any one of: <ul style="list-style-type: none"> • 10 • 19 • 21 • 23 		1

Question Number	Answer	Additional Guidance	Mark
2(c)(i)	First box = $\frac{1}{2}$ or equivalent expression for 1 mark / 0.5 Second box = $\frac{1}{4}$ or equivalent expression for 1 mark / 0.25 Conversion = $2\frac{3}{4}$ or equivalent expression for 1 mark / 2.75		3

Question Number	Answer	Additional Guidance	Mark
2(c)(ii)	4		1

Question Number	Answer	Additional Guidance	Mark
2(c)(iii)	<p>One mark for:</p> <ul style="list-style-type: none"> Numerator (top) calculation Denominator (bottom) calculation <p>Any of the following:</p> $\frac{\left(\frac{10\text{Kilobytes}}{1}\right)\left(\frac{1024\text{bytes}}{\text{Kilobytes}}\right)\left(\frac{8\text{ bits}}{\text{byte}}\right)}{\left(\frac{10\text{Megabits}}{\text{Seconds}}\right)\left(\frac{1000\text{Kilobits}}{\text{Megabits}}\right)\left(\frac{1000\text{ bits}}{\text{Kilobits}}\right)}$ $\frac{10 \times 1024 \times 8}{10 \times 1000 \times 1000}$ $\frac{81920}{10000000}$ $\frac{8192}{1000000}$ <p>Any other correct calculation where the unit conversions are discernible.</p>		2

(Total for Question 2 = 18 marks)

Question Number	Answer	Additional Guidance	Mark
3(a)	<p>One mark for each concept:</p> <p>Organisation of files is in a hierarchy/tree structure</p> <p>A node is either a folder/directory/sub-folder/sub-directory or the file itself</p> <p>The top node/folder/directory/drive is the root</p>		3

Question Number	Answer	Additional Guidance	Mark
3(b)(i)	<p>One mark for each concept:</p> <p>The client makes a connection / shares its IP with the server</p> <p>The client machine (web browser) sends a request to the server for a web page</p> <p>The server machine sends the (requested) page back to the client machine</p>		2

Question Number	Answer	Additional Guidance	Mark
3 (b) (ii)	<p>One mark for One mark for both items in One mark for inside </p> <p>Example (3 marks) Socket Open Ended </p> <p>Example (2 marks) Socket </p> <p>Example (1 mark) Socket Open Ended</p>	Ignore formatting as long as enclosure <> and </> are correct	3

Question Number	Answer	Additional Guidance	Mark
3 (c) (i)	<p>Any two of:</p> <ul style="list-style-type: none"> • Library code has already been debugged, so it should not have a bug • Library code has already been tested, so it should produce the correct results • Using libraries can reduce the time needed to develop a solution • Library code is usually optimised/faster than own code • Library code can be reused many times without having to rewrite the code 	Do not accept just 'saves time'	2

Question Number	Answer	Additional Guidance	Mark
3(c)(ii)	<p>One mark for each of (in this order only):</p> <ol style="list-style-type: none"> 1. AND 2. OR 3. NOT 4. AND <pre> ===== 1 Mon, 2 Tues, 3 Wed, 4 Thur, 5 Fri, 6 Sat, 7 Sun IF day >= 1 AND day <= 5 THEN SEND "weekday" TO DISPLAY ENDIF IF day = 6 OR day = 7 THEN SEND "weekend" TO DISPLAY ENDIF IF NOT (day >= 1 AND day <= 7) THEN SEND "error" TO DISPLAY ENDIF </pre>		4

Question Number	Answer			Additional Guidance	Mark
3(d)	One mark for each row (maximum 4 marks):			Do not penalise spelling	
	(1)	SELECT (id, description)			
	(1)	FROM tblProduct			
	(1)	WHERE id LIKE 'G%'	Pattern must be discernible as a string (""), the letter G (g), and a wild card character (*,#,?)		
		WHERE id >="G000" AND id <="G999"	Pattern must be discernible as a string (""), the letter G (g), and the operator "AND"		
	(1)	ORDER BY id ASC	Award ASCEND(ING)		
					4

(Total for Question 3 = 18 marks)

Question Number	Answer	Additional Guidance	Mark
4 (a)	<p>Any two of:</p> <ul style="list-style-type: none"> • Both the instructions and data for a program are stored in main memory • Instructions and data are stored in binary code • Instructions and data are fetched, decoded, and executed in a sequence by the CPU 		2

Question Number	Answer	Additional Guidance	Mark
4 (b) (i)	<p>One mark for:</p> <ul style="list-style-type: none"> • Software (layer) <p>One mark for any of:</p> <ul style="list-style-type: none"> • Allows the operating system on one physical computer to simulate another computer, usually of a different operating system. • Allows a guest operating system to reside on a machine • Allows a program written for one machine to run on another without changes (Java Virtual Machine). • Any other appropriate and correct response. 	An example (JVM or Linux on Windows) is not enough for marks	2

Question Number	Answer	Additional Guidance	Mark
4(b)(ii)	<p>At least one from both sections for full marks</p> <p>Any four of:</p> <p>Sequential:</p> <ul style="list-style-type: none"> • Individual instructions are executed one after another • Flow control is accomplished by jump/branch/goto instructions • Results are usually achieved less quickly than parallel processing (do not award twice) <p>Parallel:</p> <ul style="list-style-type: none"> • Individual instructions can be routed to different processors for simultaneous execution • Results are usually achieved quicker than sequential instruction (do not award twice) • Requires multi-core processors or multiple microprocessors • Tasks may be split into different parts with each part executed on a different processor • Results need to be merged back together after completion <p>Any other appropriate and correct response.</p>		4

Question Number	Answer	Additional Guidance	Mark
4(c)(i)	<p>Coding solution (one mark for each item):</p> <ul style="list-style-type: none"> • Calling code must provide an input parameter • <code>calcCircleArea</code> signature must take an input parameter • Input parameter must be used in calculation <pre> 47 48 calcCircleArea (radiusOfCircle) 49 50 PROCEDURE calcCircleArea (radiusOfCircle) 51 BEGIN PROCEDURE 52 SET area TO Pi * radiusOfCircle * radiusOfCircle 53 SEND area TO DISPLAY 54 END PROCEDURE 55 </pre>	Ignore any reference to data types	3

Question Number	Answer	Additional Guidance	Mark								
4(c)(ii)	<p>One mark for each correct cell</p> <table border="1"> <thead> <tr> <th>Pupil Number Visited</th> <th>Sub-list</th> </tr> </thead> <tbody> <tr> <td>2245</td> <td>837, 1529, 1683</td> </tr> <tr> <td>1529</td> <td>1683</td> </tr> <tr> <td>1683</td> <td></td> </tr> </tbody> </table>	Pupil Number Visited	Sub-list	2245	837, 1529, 1683	1529	1683	1683			5
Pupil Number Visited	Sub-list										
2245	837, 1529, 1683										
1529	1683										
1683											

Question Number	Answer	Additional Guidance	Mark																									
4 (c) (iii)	<p>One mark for each correct column</p> <table border="1" data-bbox="409 456 1375 683"> <thead> <tr> <th>A</th> <th>B</th> <th>R = A OR B</th> <th>S=NOT(A AND B)</th> <th>Q=R AND S</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>0</td> <td>1</td> <td>0</td> </tr> <tr> <td>0</td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> </tr> <tr> <td>1</td> <td>0</td> <td>1</td> <td>1</td> <td>1</td> </tr> <tr> <td>1</td> <td>1</td> <td>1</td> <td>0</td> <td>0</td> </tr> </tbody> </table>	A	B	R = A OR B	S=NOT(A AND B)	Q=R AND S	0	0	0	1	0	0	1	1	1	1	1	0	1	1	1	1	1	1	0	0		3
A	B	R = A OR B	S=NOT(A AND B)	Q=R AND S																								
0	0	0	1	0																								
0	1	1	1	1																								
1	0	1	1	1																								
1	1	1	0	0																								

(Total for Question 4 = 19 marks)

Question Number	Answer	Additional Guidance	Mark
5(a)	<p>Characteristics – Any of the following:</p> <ul style="list-style-type: none"> • Branch of computer science based on enabling computers to behave like humans/mimic aspects of human intelligence • AI is implemented in software. • Combines psychology, biology, linguistics, mathematics, neuroscience, and philosophy (ethics) • AI is not the same as the general intelligence of human beings <p>Uses – Any of the following:</p> <ul style="list-style-type: none"> • Game playing (chess, quiz, video games) • Analytics (analyse buying patterns, predicting behaviours, predictive text, financial markets) • Image processing (recognising objects/patterns) • Logistics (scheduling, order fulfilment) • Control systems (cars, manufacturing, weapons, navigation) • Expert systems (medical, mechanical, electrical diagnosis) • Neural networks (simulating neuron behaviours as in brains) • Natural languages processing (chatterbots, chatbots, speech recognition) • Robotics (dangerous situations, help aged or disabled) <p>Ethical issues – Any of the following:</p> <ul style="list-style-type: none"> • Take the work of humans, thereby affecting employment rates • Is a computer to be trusted to make decisions (life-death)? 	A bulleted list of facts is only worth 2 marks max.	6

	<ul style="list-style-type: none"> • If a computer discovers something that humans can't prove, should it be accepted as truth? • Do AI machines have rights? • Will people be comfortable interacting with machines that are considered intelligent? <p>Quality of Written Communication:</p> <ul style="list-style-type: none"> • 1-2: Some basic points from at least one of the categories; little clarification or expansion of points; spelling, grammar, and punctuation errors hinder meaning. • 3-4: At least one relevant point from two categories; some clarification or expansion of points; spelling, grammar, and punctuation errors occur, but do not hinder meaning. • 5-6: Relevant points from three categories; comprehensive clarification or expansion of points; spelling, grammar, and punctuation are used accurately and meaning is clear. <p>Example: Robots are machines that use artificial intelligence to do jobs that people tell them to. They are not as smart as real humans. One category only; no expansion; QWC ok; 2 marks max)</p> <p>Example: Artificial intelligence is based on getting machines to behave like humans. The cleverness of AI is really in the software. AI is used in game playing. Recently the AI software has beat humans at some games. (Two categories; Some expansion; QWC ok; 4 marks max)</p>		
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	<p>Example: AI is a branch of computer science that tries to make software imitate human intelligence. However, we're not there yet. It is used in expert systems to diagnose problems with car engines. It can also be used to predict which products people might buy in a grocery store based on their loyalty card purchases. There are problems with AI. One is the issue of ethics. Courts may decide that AI robots have the same rights as humans. People may not like the idea of computers making life and death decisions, such as when to turn off life support systems. This may make people very uncomfortable. (Three categories; Comprehensive expansion; QWC ok; 6 marks max)</p> <p>Example: AI:</p> <ul style="list-style-type: none">• Making robots behave like humans <p>Uses:</p> <ul style="list-style-type: none">• Used to help people with disabilities live in normal homes <p>Ethical Issues:</p> <ul style="list-style-type: none">• They will be taking over human jobs and putting people out of work <p>(Three categories; QWC unmarkable; 2 marks max)</p>		
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Question Number	Answer	Additional Guidance	Mark																																				
5(b)(i)	<p>One mark for initialisation of variables (max 1 mark) One mark for each complete pass of loop (max 4 marks)</p> <table border="1" data-bbox="407 379 1317 762"> <thead> <tr> <th>R3</th> <th>R4</th> <th>R5</th> <th></th> </tr> </thead> <tbody> <tr> <td>1</td> <td>2</td> <td>4</td> <td>1 mark</td> </tr> <tr> <td>2</td> <td></td> <td></td> <td rowspan="2">1 mark</td> </tr> <tr> <td></td> <td></td> <td>3</td> </tr> <tr> <td>4</td> <td></td> <td></td> <td rowspan="2">1 mark</td> </tr> <tr> <td></td> <td></td> <td>2</td> </tr> <tr> <td>8</td> <td></td> <td></td> <td rowspan="2">1 mark</td> </tr> <tr> <td></td> <td></td> <td>1</td> </tr> <tr> <td>16</td> <td></td> <td></td> <td rowspan="2">1 mark</td> </tr> <tr> <td></td> <td></td> <td>0</td> </tr> </tbody> </table> <p>Other formats for this table are acceptable. For example, each combination of 2 values may be on a single line (indicated in grey).</p>	R3	R4	R5		1	2	4	1 mark	2			1 mark			3	4			1 mark			2	8			1 mark			1	16			1 mark			0		5
R3	R4	R5																																					
1	2	4	1 mark																																				
2			1 mark																																				
		3																																					
4			1 mark																																				
		2																																					
8			1 mark																																				
		1																																					
16			1 mark																																				
		0																																					

Question Number	Answer	Additional Guidance	Mark
5 (b) (ii)	Calculates the number defined as one of (or equivalent statement) <ul style="list-style-type: none"> • $R4^{R5}$ • 16 • 2^4 • $2 \times 2 \times 2 \times 2$ 		1

Question Number	Answer	Additional Guidance	Mark						
5 (b) (iii)	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 20%;">Part</th> <th>Name</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">MOV</td> <td>Opcode / operation code field / operation</td> </tr> <tr> <td style="text-align: center;">R4, #2</td> <td>Operand / operand code field / operand field</td> </tr> </tbody> </table>	Part	Name	MOV	Opcode / operation code field / operation	R4, #2	Operand / operand code field / operand field	<ul style="list-style-type: none"> • Do not penalise spelling 	2
Part	Name								
MOV	Opcode / operation code field / operation								
R4, #2	Operand / operand code field / operand field								

Question Number	Answer	Additional Guidance	Mark				
5(b)(iv)	<p>One mark for each of:</p> <ul style="list-style-type: none"> • Initialisation (R3, R4, R5) • Correct loop construction showing blocking • Correct two lines inside of loop blocking <table border="1" data-bbox="409 496 1565 1270"> <tbody> <tr> <td data-bbox="409 496 981 871"> <pre>SET R3 TO 1 SET R4 TO 2 SET R5 TO 4 WHILE R5 <> 0 SET R3 TO R3 * R4 SET R5 TO R5 - 1 END WHILE</pre> </td> <td data-bbox="981 496 1565 871"> <pre>SET R3 TO 1 SET R4 TO 2 SET R5 TO 4 FOR X FROM 1 TO R5 DO SET R3 TO R3 * R4 SET R5 TO R5 - 1 END FOR</pre> </td> </tr> <tr> <td data-bbox="409 871 981 1270"> <pre>SET R3 TO 1 SET R4 TO 2 SET R5 TO 4 REPEAT SET R3 TO R3 * R4 SET R5 TO R5 - 1 UNTIL R5 = 0</pre> </td> <td data-bbox="981 871 1565 1270"> <pre>SET R3 TO 1 SET R4 TO 2 SET R5 TO 4 FOR EACH X FROM R5 DO SET R3 TO R3 * R4 SET R5 TO R5 - 1 END FOR</pre> </td> </tr> </tbody> </table>	<pre>SET R3 TO 1 SET R4 TO 2 SET R5 TO 4 WHILE R5 <> 0 SET R3 TO R3 * R4 SET R5 TO R5 - 1 END WHILE</pre>	<pre>SET R3 TO 1 SET R4 TO 2 SET R5 TO 4 FOR X FROM 1 TO R5 DO SET R3 TO R3 * R4 SET R5 TO R5 - 1 END FOR</pre>	<pre>SET R3 TO 1 SET R4 TO 2 SET R5 TO 4 REPEAT SET R3 TO R3 * R4 SET R5 TO R5 - 1 UNTIL R5 = 0</pre>	<pre>SET R3 TO 1 SET R4 TO 2 SET R5 TO 4 FOR EACH X FROM R5 DO SET R3 TO R3 * R4 SET R5 TO R5 - 1 END FOR</pre>	<ul style="list-style-type: none"> • Accept alternate solution of DO/WHILE as long as test is “R5 <> 0” • Do not penalise pseudocode usage as long as response is blocked and discernible • A specific language construct of a while, repeat, or for loop should be awarded if blocked and discernible 	3
<pre>SET R3 TO 1 SET R4 TO 2 SET R5 TO 4 WHILE R5 <> 0 SET R3 TO R3 * R4 SET R5 TO R5 - 1 END WHILE</pre>	<pre>SET R3 TO 1 SET R4 TO 2 SET R5 TO 4 FOR X FROM 1 TO R5 DO SET R3 TO R3 * R4 SET R5 TO R5 - 1 END FOR</pre>						
<pre>SET R3 TO 1 SET R4 TO 2 SET R5 TO 4 REPEAT SET R3 TO R3 * R4 SET R5 TO R5 - 1 UNTIL R5 = 0</pre>	<pre>SET R3 TO 1 SET R4 TO 2 SET R5 TO 4 FOR EACH X FROM R5 DO SET R3 TO R3 * R4 SET R5 TO R5 - 1 END FOR</pre>						

	<pre> SET R3 TO 1 SET R4 TO 2 SET R5 TO 4 REPEAT R5 TIMES SET R3 TO R3 * R4 SET R5 TO R5 - 1 END REPEAT </pre>	<pre> SET R3 TO 1 SET R4 TO 2 SET R5 TO 4 FOR X FROM 1 TO R5 STEP 1 DO SET R3 TO R3 * R4 SET R5 TO R5 - 1 END FOR </pre>		
<p>Other solutions may be correct, as long as it includes a sensible loop with the correct test for terminating condition.</p>				

(Total for Question 5 = 17 marks)

Total for paper = 90 marks

Content Mapping Grid

Question	Specification	Marks
1a(i)	5.1.5	1
1a(ii)	5.2.1	1
1a(iii)	5.2.9	1
1a(iv)	5.1.2	4
1b(i)	3.4.1	1
1b(ii)	3.4.2	2
1c(i)	3.1.4	1
1c(ii)	3.1.5	1
1c(iii)	3.1.5	1
1c(iv)	3.2.4	1
1d(i)	3.3.2	1
1d(ii)	3.3.2	1
1e	2.4.3 1.1.1	2
2a	6.1.3	3
2b(i)	4.5.1	4
2b(ii)	2.1.2	1
2b(iii)	2.2.1	1
2b(iv)	2.2.2	1

Question	Specification	Marks
2b(v)	2.3.5	1
2b(vi)	2.3.5	1
2c(i)	3.1.2	3
2c(ii)	3.3.1	1
2c(iii)	3.3.4	2
3a	4.4.1	3
3b(i)	5.2.4	2
3b(ii)	5.2.3	3
3c(i)	2.6.1	2
3c(ii)	4.3.2	4
3d	3.5.3	4
4a	4.2.2	2
4b(i)	4.1.1	2
4b(ii)	4.1.2	4
4c(i)	2.6.3	3
4c(ii)	1.1.8	5
4c(iii)	4.3.1	3
5a	6.1.1	6

Question	Specification	Marks
5b(i)	2.1.6	5
5b(ii)	1.1.1	1
5b(iii)	4.2.3	2
5b(iv)	2.2.2	3