

QUESTION 1.

CAMBRIDGE INTERNATIONAL EXAMINATIONS

Cambridge International Advanced Subsidiary and Advanced Level



MARK SCHEME for the October/November 2015 series

9608 COMPUTER SCIENCE

9608/11

Paper 1 (Written Paper), maximum raw mark 75

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

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Page 2	Mark Scheme
	Cambridge International AS/A Level – October/November 2015



1 (a) any **two** from:

- sequence of digital signals / bits
- over a communication path / Internet
- transfer of data at high speed
- requires fast broadband connection
- requires some form of buffering
- bits arrive in the same order as sent

[2]

(b) (i) any **two** from:

- no need to wait for a whole file to be downloaded
- no need to store large files on user's computer
- allows on demand playback
- no specialist software is required for playback in browser

[2]

(ii) any **two** from:

- video stops / hangs if very slow Internet / broadband speed low
- video stops / hangs if inadequate buffering capacity
- loss of Internet means can't access films / files
- may require specific software to run the files / films
- viruses can be downloaded from the websites

[2]

(c) 2 marks for on-demand and 2 marks for real-time

on-demand

- digital video tape, analogue video tape, or digital files are converted to bit streaming – format for broadcasting on the net; this is known as encoding, these encoded streaming video files are then uploaded to a dedicated server
- a link for the encoded video is placed on a web site
- a user clicks on the link to download the encoded streaming video; the streamed video is then broadcast to the user as and when they require it
- can be paused / can go back and re-watch / fast-forward, etc.

real-time

- an event is captured live with a video camera
- the video camera is connected to a computer
- the video signal is converted to streaming media files (encoded) on the computer
- the encoded feed is then uploaded from the computer to a dedicated streaming server via cable, DSL, or a high-speed internet connection
- the server then sends the live images it to all users requesting it as real-time video streaming
- cannot be paused etc.

[4]



2 (a) A = control bus

B = address bus

C = data bus

(b) Program Counter – stores the address of next instruction to be executed

Memory Data Register – stores the data in transit between memory and other registers // holds the instruction before it is passed to the CIR

Current Instruction Register – stores the current instruction being executed

Memory Address Register – stores the address of the memory location which is about to be accessed [4]

3 (a)

Statement	True (✓)
The IP address consists of any number of digits separated by single dots (.)	
Each number in an IP address can range from 0 to 255	✓
IP addresses are used to ensure that messages and data reach their correct destinations	✓
Public IP addresses are considered to be more secure than private IP addresses	

accept words TRUE or FALSE in right hand column

1 mark per tick, –1 mark for each wrong tick if more than 2

[2]

(b) (i) http – enables browser to know what protocol is being used to access information in the domain

cie.org.uk – cie.org.uk is the domain name

computerscience.html – actual web page / file being viewed

[3]

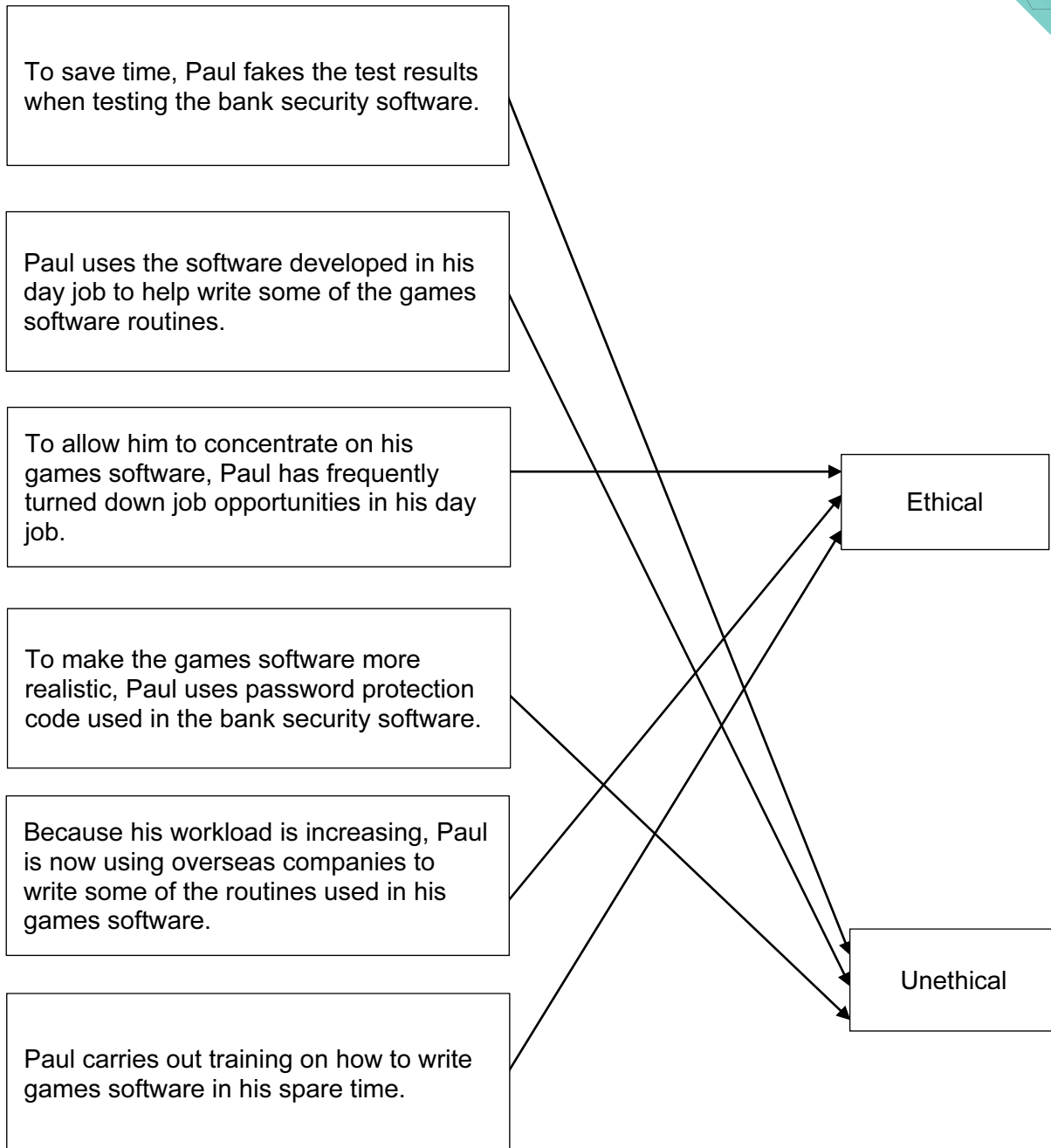
(ii) %20 – because <space> not allowed in a URL, %20 is the coding for a space (32 in denary)

? – separates the URL from all parameters or variables

[2]



4



1 mark for each correct line, two lines from one box is incorrect

[6]

Page 5	Mark Scheme
	Cambridge International AS/A Level – October/November 2015



- 5 (i) any **four** from:
- sensors send signals / data to a computer
 - data / signal converted to digital (using an ADC)
 - computer calculates the activity value based on sensor signal strength / data
 - if calculated value > 3,
 - determine location of sensor
 - build up a map of seismic activity
 - location and magnitude sent to printer
 - ... via USB port / wireless link
 - monitoring is continuous [4]
- (ii) – output / hard copy not picked up in good time [1]
- (iii) 1 mark for name + 1 mark for reason for choice
- speaker / buzzer / alarm bell
 - gives control room operators an audible warning
 - flashing lights
 - gives control room operators an visual warning
 - monitor
 - use of red / flashing colours on monitor gets the attention of operators [2]
- 6 any **four** points from (maximum 3 marks per type of cable):
- fibre optic cables have greater bandwidth
 - fibre optic cables need less signal boosting // can transmit over longer distances
 - fibre optic cables have greater security (more difficult to “tap” into)
 - fibre optic cables are immune to electromagnetic and other effects
 - fibre optic cabling is lighter in weight (easier to install)
 - fibre optic cables consume less power
 - copper cabling is less expensive to install
 - copper cable is easier to install because it is more flexible
 - it is easier to make terminations using copper cabling
 - the expertise in use of copper cabling is more extensive
 - has been around for years ... so very little is “unknown” about installations using this type of cabling [4]



- 7 (a) (i) – at least one computer used to “serve” ...
– ... other computers are referred to as “clients”
– server provides services / applications etc. ...
– ... which may be requested by clients
- (ii) any **two** from:
- files and resources are centralised
 - creation of security / manage security
 - user needs user name and password to access network
 - centralised back-up
 - intranet capability
 - Internet monitoring
 - clients can be less powerful machines, therefore less expensive to buy
 - saving resources on server reduces the burden on the client
- [2]

(b) router [1]

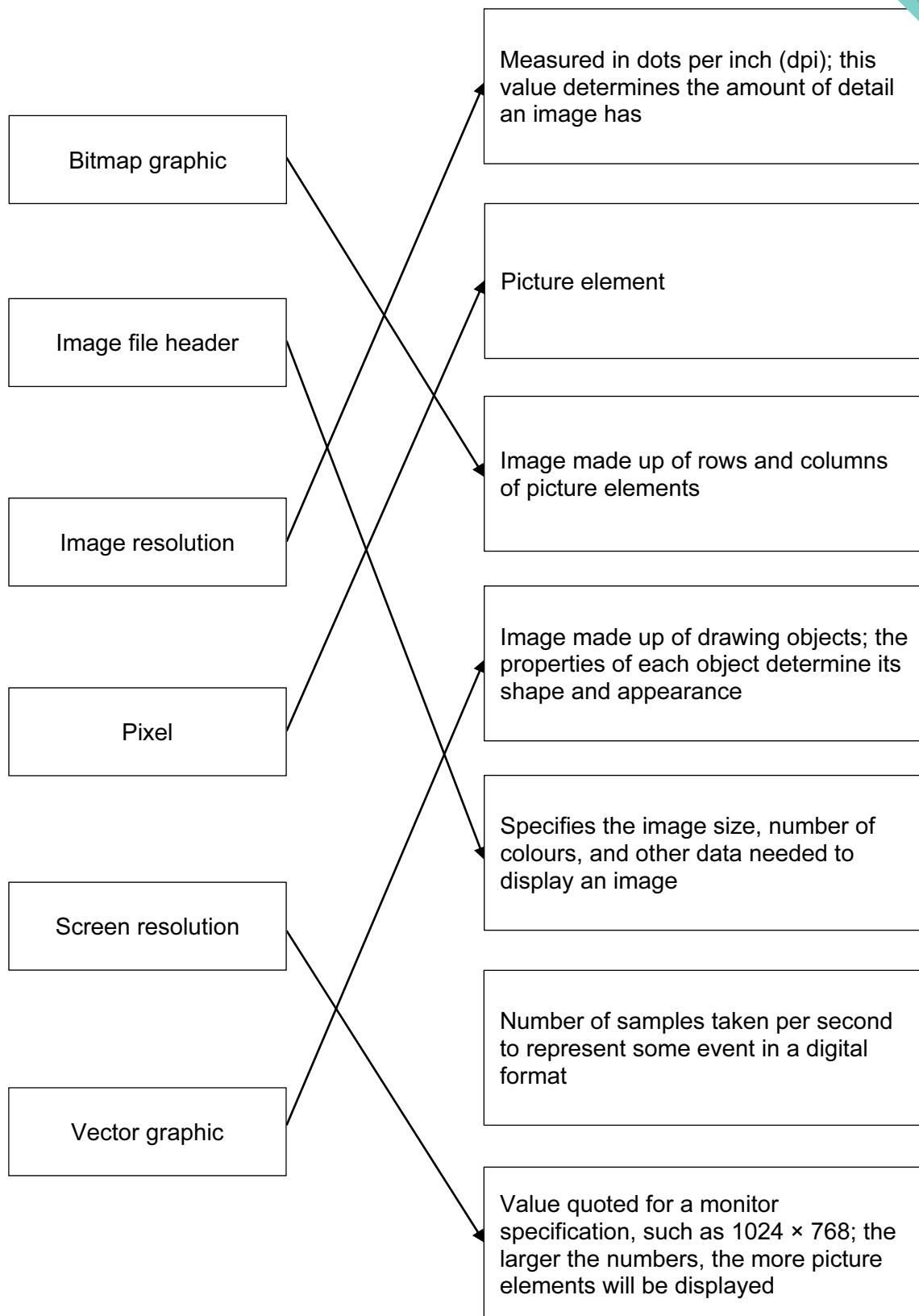
(c)

Statement	Sequence number
The requested web page is displayed on the client computer	5
The user clicks on the hyperlink and the web page is requested from the web server	1
The requested web page content is transmitted to the client computer	3
The client computer processes the JavaScript code using the web browser software	4
The web server locates the requested web page	2

[5]



8 (a)



1 mark for each correct line, two lines from one box is incorrect

[6]



(b) (i) $\frac{512 \times 256}{8 \times 1024} = 16 \text{ KB}$

1 mark for numerator + 1 mark for denominator

- (ii) so it is possible to estimate how many images can be stored / to decide if it can be sent as an email attachment [1]

9 (a) One mark for validation, one mark for verification.

validation

- check whether data is reasonable / meets given criteria

verification

- method to ensure data which is copied / transferred is the same as the original
- entering data twice and computer checks both sets of data
- check entered data against original document / source

[2]

(b) any **four** from:

- parity can be even or odd
- parity check uses the number of 1s in a binary pattern
- if there is an even / odd number of 1s, then the parity is even / odd
- following transmission ...
- parity of each byte checked
- a parity bit is used to make sure binary pattern has correct parity
- example: 1 0 0 1 0 1 1 1 has parity bit set to 1 in MSB since system uses odd parity (original data: 0 0 1 0 1 1 1 which has four 1 bits)

[4]

10 (a) any **two** from:

- malicious code / software / program
- that replicates / copies itself
- can cause loss of data / corruption of data on the computer
- can cause computer to “crash” / run slowly
- can fill up hard disk with data

[2]

(b) any **two** from:

- checks for boot sector viruses when machine is first turned on
- when an external storage device is connected
- checks a file / web page when it is accessed / downloaded

[2]



11

Statement	Interpreter	Correct
This translator creates an executable file		✓
When this translator encounters a syntax error, game execution will halt	✓	
The translator analyses and checks each line just before executing it	✓	
This translator will produce faster execution of the game program		✓
Use of this translator makes it more difficult for the user to modify the code of the game supplied to the user		✓

1 mark for each correct row

[5]

QUESTION 2.

Cambridge
International
AS & A Level

Cambridge Assessment International Education
Cambridge International Advanced Subsidiary and Advanced Level



COMPUTER SCIENCE

9608/11

Paper 1 Written Paper

October/November 2017

MARK SCHEME

Maximum Mark: 75

Published

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This document consists of **7** printed pages.

 **Cambridge Assessment**
International Education



Question	Answer									
1(a)(i)	119									
1(a)(ii)	−120									
1(a)(iii)	<table border="1"><tr><td>1</td><td>1</td><td>1</td><td>0</td><td>1</td><td>1</td><td>1</td><td>1</td></tr></table>	1	1	1	0	1	1	1	1	
1	1	1	0	1	1	1	1			
1(a)(iv)	Lowest value: −128 Highest value: +127	1								
1(b)(i)	0110 0101 0011	1								
1(b)(ii)	The second block of four binary digits represents a digit larger than 9 // 14	1								
1(b)(iii)	A string of digits on any electronic device displaying numeric values	1								

Question	Answer	Marks
2(a)	A web page contains a client-side script Each instruction in the source code consists of an op code and an operand The source code is required at run-time When the source code is translated, copies of the executable program can be distributed without the need for the source code Assembler Interpreter Compiler	4
2(b)(i)	One mark from: - The program code can be translated to run on any processor / platform - Source code is translated into machine independent intermediate code not machine dependent code	1



Question	Answer
2(b)(ii)	Two marks from: • Java uses a two-step translation process • Java code is partially interpreted – partially compiled • Code is translated first into intermediate code / "bytecode"... • ...using the Java compiler • The bytecode is finally interpreted by the Java Virtual Machine

Question	Answer	Marks																																													
3(a)	Two marks from: - Physical measures - Access rights - Encryption - Firewall - Use authentication methods such as usernames and passwords - Anti-malware program	Max 2																																													
3(b)(i)	<table border="1"><tr><td>7</td><td>X</td><td>6</td><td>=</td><td>42</td></tr><tr><td>8</td><td>X</td><td>5</td><td>=</td><td>40</td></tr><tr><td>6</td><td>X</td><td>4</td><td>=</td><td>24</td></tr><tr><td>5</td><td>X</td><td>3</td><td>=</td><td>15</td></tr><tr><td>3</td><td>X</td><td>2</td><td>=</td><td>6</td></tr><tr><td>1</td><td>X</td><td>1</td><td>=</td><td>1</td></tr><tr><td></td><td></td><td></td><td>Total:</td><td>128 / 11</td></tr><tr><td></td><td></td><td></td><td></td><td>11 R 7</td></tr><tr><td colspan="4">Check digit:</td><td>11 – 7 = 4</td></tr></table> 1 mark for 6 values 1 mark for 2 steps Accept 128 MOD 11 = 7 1 mark for subtraction Answer: 786531 4 (1 mark for answer)	7	X	6	=	42	8	X	5	=	40	6	X	4	=	24	5	X	3	=	15	3	X	2	=	6	1	X	1	=	1				Total:	128 / 11					11 R 7	Check digit:				11 – 7 = 4	4
7	X	6	=	42																																											
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6	X	4	=	24																																											
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3	X	2	=	6																																											
1	X	1	=	1																																											
			Total:	128 / 11																																											
				11 R 7																																											
Check digit:				11 – 7 = 4																																											
3(b)(ii)	One mark for name of check One mark for description Max two checks Uniqueness check Each PatientID must be unique Length check Each PatientID is exactly 7 characters Format check / Type check All 7 characters must be <u>digits</u> Presence check PatientID must be entered	Max 4																																													



Question	Answer																															
4(a)	A – System clock B – Control unit C – Main memory E – Control bus F – Data bus																															
4(b)	<table border="1"> <thead> <tr> <th>ACC</th><th>CountDown</th><th>OUTPUT</th></tr> </thead> <tbody> <tr> <td></td><td>15</td><td></td></tr> <tr> <td>67</td><td></td><td>C</td></tr> <tr> <td>15</td><td></td><td></td></tr> <tr> <td>14</td><td>14</td><td></td></tr> <tr> <td>51</td><td></td><td>3</td></tr> <tr> <td>14</td><td></td><td></td></tr> <tr> <td>13</td><td>13</td><td></td></tr> <tr> <td>32</td><td></td><td></td></tr> <tr> <td>88</td><td></td><td>x</td></tr> </tbody> </table> (1) (1) + (1) (1) (1)	ACC	CountDown	OUTPUT		15		67		C	15			14	14		51		3	14			13	13		32			88		x	5
ACC	CountDown	OUTPUT																														
	15																															
67		C																														
15																																
14	14																															
51		3																														
14																																
13	13																															
32																																
88		x																														
4(c)	Three marks from: - The assembler scans the assembly language instructions in sequence - When it meets a symbolic address checks to see if already in symbol table - If not, it adds it to the symbol table in the symbolic address column - If it is already in symbol table check if absolute address known - If the absolute address is known, it is entered in the appropriate cell - If the absolute address is not known mark / leave as unknown	Max 3																														
4(d)(i)	The op code / mnemonic / instruction table	1																														
4(d)(ii)	A – 1110 0110 0110 1000 (1) (1) B – E6 68 (1)	3																														



Question	Answer	
5(a)(i)	Three marks from: • Diaphragm / cone • (Voice) coil of wire • Spider / Suspension • (Permanent) Magnet • Basket • Dust cap • Outer frame	
5(a)(ii)	Four marks from: • Takes an electrical signal and translates it into physical vibrations to create sound waves • An electric current in the coil creates an electro-magnetic field • Changes in the audio signal causes the direction of the electric current to change • The direction of the current determines the polarity of the electro-magnet // changing the direction of the current changes the direction of the polarity of the electro-magnet • The electro-magnet is repelled by or attracted to the permanent magnet • Causing the coil to vibrate • The movement of the coil causes the cone / diaphragm to vibrate • That vibration is transmitted to the air in front of the cone / diaphragm as sound waves • The amount of movement will determine the frequency and amplitude of the sound wave produced	Max 4
5(b)(i)	One mark from: • External hard disk drive // SSD • External CD / DVD drive • Pen drive • Blu-ray drive	1
5(b)(ii)	Two marks from: • Additional secondary file storage // storing files • Backup of files • Archiving of files • Transfer files to second computer	Max 2



Question	Answer	
6(a)	Two marks from: - A system of moral principles - That guide behaviour / decision making - Based on philosophical / religious views - By example, e.g. respectful and considerate behaviour	
6(b)	One mark for identifying the issue One mark for correct principle One mark for possible action Max 2 issues (2 × 3 marks) - Uncomfortable with one of his colleagues Client and Employer // Management / Colleagues // Judgement // Self For example: Team building exercises // arranged meeting - Unfamiliar with programming language Self // Client and Employer // Product // Profession // Colleagues For example: Undergo training - Visit to unfamiliar workplace Client and employer // Management // Judgement // Profession // Colleagues For example: He should speak to his manager to discuss situation	Max 6

Question	Answer	Marks
7(a)(i)	<u>PatientID</u> } <u>DoctorID</u> } (1) <u>AppointmentDate, AppointmentTime</u> (1)	2
7(a)(ii)	One PATIENT attends many APPOINTMENTs One DOCTOR takes many APPOINTMENTs Special case for 1 mark only (only if no one to many relationships shown) Many PATIENTs are seen by many DOCTORs	2



Question	Answer	
7(b)	Two marks from: Either: - Add an attribute (for example <code>Attended</code>) - To the appointment table // <code>APPOINTMENT</code> Or: - Add an attribute (for example <code>AppointmentsMissed</code>) - To the patient table // <code>PATIENT</code>	
7(c)(i)	Available to work at both <code>SITE-A</code> and <code>SITE-B</code>	1
7(c)(ii)	<code>APPOINTMENT(Site, AppointmentDate, AppointmentTime, DoctorID, PatientID)</code>	1
7(d)(i)	One mark per line <code>UPDATE DOCTOR</code> <code>SET DoctorID = '017'</code> <code>WHERE DoctorID = '117';</code>	3
7(d)(ii)	1 Mark per bullet, max 2 - Referential integrity should be maintained // Referential integrity could be violated. - Data becomes inconsistent - There may be records in the <code>APPOINTMENT</code> table showing doctor ID 117 - The <code>APPOINTMENT</code> table might not be automatically updated - Records in the <code>APPOINTMENT</code> table will become orphaned	Max 2
7(e)	One mark per line <code>SELECT AppointmentDate, AppointmentTime</code> <code>FROM APPOINTMENT</code> <code>WHERE PatientID = '556';</code>	3

QUESTION 3.



Question	Answer	
2(a)	1 Mark for each correct connection <pre> graph LR S1["The source code is written in a high-level language. An executable file is produced."] --> A[Assembler] S2["The source code uses instructions from the processor's instruction set"] --> I[Interpreter] S3["The source code and translation software must both be in main memory at execution time"] --> C[Compiler] S4["A web page contains some JavaScript code."] --> I </pre>	
2(b)(i)	1 Mark per bullet, max 2 • Once translated the compiler software is not needed to run the program • Compiled code should execute faster • Compiler produces an executable file • The executable file produced by a compiler can be distributed without users having sight of the source code // source code is kept secure // users are unable to make changes to the program • Cross-compilation is possible	2
2(b)(ii)	1 Mark per bullet, max 2 • Easier de-bugging • The interpreter stops when error encountered • error can be corrected in real time • The interpreter translates a statement then executes it immediately • Parts of the program can be tested, without all the program code being available.	2



Question	Answer
3(a)(i)	1 Mark per bullet, max 3 • Security is keeping the data safe • From accidental / malicious damage /loss • By example of need for security • Privacy is the need to restrict access to personal data • To avoid it being seen by unauthorised people • By example of need for privacy

QUESTION 4.



Question	Answer	Marks
4(a)(i)	1 mark for each type of addressing Direct addressing • The operand is the address where the data is stored Indirect addressing • The operand is an address, that address holds another address where the data is stored	2



Question	Answer													
4(a)(ii)	1 mark per bullet point Direct addressing: 20 is the address of the data Indirect addressing: 20 is an address which holds the address where the data is stored													
4(b)	1 mark for 1 correct tick 2 marks for 3 correct ticks <table border="1" data-bbox="392 616 1240 880"> <thead> <tr> <th>Instruction</th><th>Symbolic</th><th>Absolute</th></tr> </thead> <tbody> <tr> <td>ADD 90</td><td></td><td>✓</td></tr> <tr> <td>CMP found</td><td>✓</td><td></td></tr> <tr> <td>STO 20</td><td></td><td>✓</td></tr> </tbody> </table>	Instruction	Symbolic	Absolute	ADD 90		✓	CMP found	✓		STO 20		✓	2
Instruction	Symbolic	Absolute												
ADD 90		✓												
CMP found	✓													
STO 20		✓												
4(c)(i)	186	1												
4(c)(ii)	BA	1												
4(c)(iii)	−70	1												
4(d)	1 mark per bullet point - Outputting * (instruction 71) - Storing 130 in 203 (instruction 72) - Loading, incrementing accumulator and storing in 204 (instructions 73, 74 and 75) - Incrementing Index Register (instruction 76) - Loading 133, comparing and jumping to 81 (instructions 77, 78 and 79) - Loading, comparing and jumping to 74 (instructions 81, 82 and 83) - Incrementing accumulator, storing in 204 and incrementing index register, loading 130 (instructions 74–79) - Outputting * to end (instructions 80–84)	8												

[illegible]