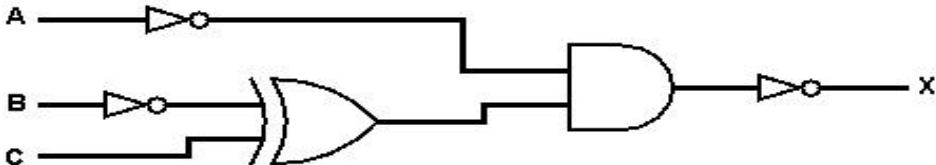


Question	Answer	Marks
1(a)	1 mark for: (A XOR B) NOR C	1
1(b)	1 mark for NOT B XOR C 1 mark for NOT A and final AND plus NOT 	2
2(a)	1 mark each to max 2: <ul style="list-style-type: none"> The doorbell only performs the specific tasks of motion detection/video recording/doorbell ringing The motion sensor and digital camera are built into the doorbell The CPU/memory/storage/software are all dedicated to this task only Only a dedicated microprocessor is required due to the limited processing requirements 	2
2(b)	No mark for identification of monitoring or control 1 mark each to max 2 for justification: Monitoring: <ul style="list-style-type: none"> The turning on of the digital camera does not affect the input to the sensor/button The transmission of the data/video does not affect the input to the sensor/button The ringing of the doorbell does not affect the input to the button Control: <ul style="list-style-type: none"> Video doorbell does not only store the values from the motion sensor The data is processed, generating a signal to start the digital camera recording Button pressed/motion detected causes a signal to be sent over a network to the smartphone 	2
2(c)(i)	1 mark each to max 2: <ul style="list-style-type: none"> Current reading/data from motion sensor Current/recent video Instructions being executed Start-up/BIOS/boot-up instructions 	2

Question	Answer	Marks										
2(c)(ii)	<div>1 mark for each row:</div> <table><tr><th>Statement</th><th>Answer</th></tr><tr><td>The two types of logic gate that can be used to create solid state devices</td><td>NAND NOR</td></tr><tr><td>The number of transistors contained in each cell</td><td>2</td></tr><tr><td>The type of gate that can retain electrons without power</td><td>floating</td></tr><tr><td>The type of gate that allows or stops current from passing through</td><td>control</td></tr></table>	Statement	Answer	The two types of logic gate that can be used to create solid state devices	NAND NOR	The number of transistors contained in each cell	2	The type of gate that can retain electrons without power	floating	The type of gate that allows or stops current from passing through	control	4
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2(c)(iii)	<div>1 mark each to max 2:</div> <ul style="list-style-type: none">• Captured video is transmitted to buffer• ... video is transmitted from buffer to smartphone• Store recent data in a buffer for the user to rewind• ... instead of storing everything in secondary storage• Store readings from motion sensor• ... until the microprocessor can process them• Store video from digital camera• ... before moving it to secondary storage	2										
2(d)	<div>1 mark each to max 3:</div> <ul style="list-style-type: none">• Data transmission to user’s smartphone will take longer• ... because there is more data to transmit• The secondary storage device will fill faster• ... fewer videos will be able to be stored long-term // videos are overwritten more often	3										
2(e)(i)	<div>1 mark for:</div> <div>Continuous ordered flow of bits over a communication path</div>	1										
2(e)(ii)	<div>1 mark each to max 2:</div> <ul style="list-style-type: none">• Real-time is direct from source whereas on-demand is pre-recorded/downloaded to view later• Real-time cannot be re-watched, on-demand can be paused, re-watched etc.• Real-time plays continually, on-demand downloads sections/blocks and cannot play until next section is downloaded	2										

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3(a)	1 mark each to max 2: <ul style="list-style-type: none"> The interpreter will stop when an error is found ... so the error can be corrected in real-time, and the result of changes seen immediately Only one error is displayed at a time ... so fewer errors to correct simultaneously and no dependent errors 	2															
3(b)	1 mark each to max 3: <ul style="list-style-type: none"> Program can be distributed without source code ... so it cannot be edited/stolen/plagiarised Users do not require the translator to run the program ... so time is not spent retranslating by user 	3															
4(a)	1 mark for each correct answer: <table border="1"> <thead> <tr> <th>Program Number</th><th>Code</th><th>ACC Content</th></tr> </thead> <tbody> <tr> <td>1</td><td>LDD 20 ADD #2</td><td>4</td></tr> <tr> <td>2</td><td>LDX 22</td><td>5</td></tr> <tr> <td>3</td><td>LDI 25 INC ACC SUB 22</td><td>1</td></tr> <tr> <td>4</td><td>LDD 19 LDM #5 LDM #25</td><td>25</td></tr> </tbody> </table>	Program Number	Code	ACC Content	1	LDD 20 ADD #2	4	2	LDX 22	5	3	LDI 25 INC ACC SUB 22	1	4	LDD 19 LDM #5 LDM #25	25	4
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5(a)	<p>1 mark each:</p> <ul style="list-style-type: none"> • Identification of server in the bank scenario • Description e.g. Receives requests, processes the requests • Identification of client in bank scenario • Description e.g. Sends request to the server, waits and outputs the response 	4
5(b)	<p>1 mark for each correctly completed term:</p> <ul style="list-style-type: none"> • odd or even • 7-bits • odd • block • byte <p>Computer A and Computer B agree on whether to use odd or even parity. Computer A divides the data into groups of 7-bits. The number of 1s in each group is counted. If the agreed parity is odd and the group has an even number of 1s a parity bit of 1 is appended, otherwise a parity bit of 0 is appended.</p> <p>In a parity block check the bytes are grouped together, for example in a grid. The number of 1s in each column (bit position) is counted. A bit is assigned to each column to make the column match the parity. These parity bits are transmitted with the data as a parity byte.</p>	5
5(c)(i)	<p>1 mark each to max 3:</p> <ul style="list-style-type: none"> • Compares all incoming and outgoing transmissions • ... against set criteria/whitelist/blacklist • Blocks all transmissions that do not meet rules • Blocks data entering from specific ports • Blocks unauthorised/unknown internal software transmitting data 	3
5(c)(ii)	<p>1 mark each to max 4:</p> <p>e.g.</p> <ul style="list-style-type: none"> • Captures an image of the face • Uses image recognition • Trained to identify the features of a face in an image • ... using a large number of images • Analyse images for facial features • Uses the probability of a match 	4

Question	Answer	Marks
6(a)	<p>1 mark each:</p> <ul style="list-style-type: none"> User table with the username as the Primary Key ... containing at least email address, date of birth / age and rating Quiz table with Quiz ID or date or file name as the Primary Key. ... containing at least the other field(s) not used as the PK A joining table with an appropriate name including at least fields for user identification, quiz identification and score ... with an appropriate Primary Key ... and Foreign Keys matching the Primary Keys of the other two tables <pre> USER(<u>Username</u>, Email, DateOfBirth, Rating) QUIZ(<u>QuizID</u>, Date, Filename) USER QUIZ(<u>Username</u>, <u>QuizID</u>, Score) </pre>	6
6(b)	<p>1 mark each to max 2 for data dictionary and max 2 for logical schema:</p> <p>Data dictionary:</p> <ul style="list-style-type: none"> Data about the data in the database // metadata Identifies the characteristics of the data that will be stored Appropriate example e.g. field names, table name, validation rules, data types, primary / foreign keys, relationships etc. <p>Logical schema:</p> <ul style="list-style-type: none"> Conceptual design Platform/database independent overview of the database Is used to design the physical structure Appropriate example e.g. Design of entities / E-R diagram / views 	4
6(c)(i)	<p>1 mark for each correct clause:</p> <ul style="list-style-type: none"> Alter table EVENT Adding foreign key as PlayerID referencing correct table <pre> ALTER TABLE EVENT ADD FOREIGN KEY (PlayerID) REFERENCES PLAYER (PlayerID); </pre>	2
6(c)(ii)	<p>1 mark each:</p> <ul style="list-style-type: none"> Selecting PlayerID from EVENT Counting EventID Grouping by the PlayerID <p>Example:</p> <pre> SELECT PlayerID, COUNT (EventID) FROM EVENT GROUP BY PlayerID; </pre>	3

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7	<p>1 mark each:</p> <ul style="list-style-type: none">Working – carried values clearly indictedCorrect answer 0001 1000Overflow clearly indicated as overflow <p>Example:</p> <div><div>10011110</div><div>01100001</div><div>+ 00011001</div><div><div>(1)00011000</div><div>1111111.....(carries)</div></div></div>	3																								
8(a)	<p>1 mark for each correct row:</p> <table><thead><tr><th>Statement</th><th>Bus</th><th>Star</th><th>Mesh</th></tr></thead><tbody><tr><td>all devices connect to one central device</td><td></td><td>✓</td><td></td></tr><tr><td>all devices connect to a central cable</td><td>✓</td><td></td><td></td></tr><tr><td>multiple paths for the packets to travel</td><td></td><td></td><td>✓</td></tr><tr><td>robust against damage because if any line fails, the rest of the network retains full functionality</td><td></td><td>✓</td><td>✓</td></tr><tr><td>most likely to lose data through collisions</td><td>✓</td><td></td><td></td></tr></tbody></table>	Statement	Bus	Star	Mesh	all devices connect to one central device		✓		all devices connect to a central cable	✓			multiple paths for the packets to travel			✓	robust against damage because if any line fails, the rest of the network retains full functionality		✓	✓	most likely to lose data through collisions	✓			5
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8(b)(i)	<p>1 mark for:</p> <p>to be visible to and accessible by other devices on the internet</p>	1																								
8(b)(ii)	<p>1 mark each:</p> <ul style="list-style-type: none">IPv4 has 4 groups of digits whilst IPv6 has 8 groupsIPv4 is usually represented in denary whilst IPv6 is usually represented in hexadecimalIPv4 groups are between 0 and 255 whilst IPv6 is between 0 and FFFFIPv4 is 32 bits whilst IPv6 is 128 bits	2																								