

QUESTION 4.



8 (a) (i) Database Management System

- (ii) **One mark** for identifying the way in which the data security is ensured, and **one mark** for a further description.

Maximum of two marks per method. **Maximum of two methods.**

[4]

- Issue username and passwords...
 - stops unauthorised access to the data
 - any further expansion e.g. strong passwords / passwords should be changed regularly etc...
- Access rights / privileges...
 - so that only relevant staff / certain usernames can read/edit certain parts of the data
 - can be read only, or full access / read, write and delete
 - any relevant example e.g. only class tutors can edit details of pupils in their tutor group
- Create (regular / scheduled) backups...
 - in case of loss/damage to the live data a copy is available
 - any relevant example e.g. backing up the attendance registers at the end of each day and storing the data off-site/to a separate device
- Encryption of data...
 - if there is unauthorised access to the data it cannot be understood // needs a decryption key
 - any relevant example e.g. personal details of pupils are encrypted before being sent over the Internet to examination boards
- Definition of different views...
 - composed of one or more tables
 - controls the scope of the data accessible to authorised users
 - any relevant example e.g. teachers can only see their classes
- Usage monitoring / logging of activity...
 - creation of an audit /activity log
 - records the use of the data in the database / records operations performed by all users / all access to the data
 - any relevant example, e.g. Track who changed a student's grade

- (iii) **Two points** from:

[2]

- Set up search criteria
- To find / retrieve / return the data that matches the criteria
- Any relevant example e.g. find pupils who were absent on a particular day



(iv) Three points from:

- By storing data in (separate) linked tables data redundancy is reduced / data duplication is controlled...
- Compatibility / data integrity issues are reduced as data only needs to be updated once / is only stored once.
- Unwanted or accidental deletion of linked data is prevented as the DBMS will flag an error.
- Program - data dependence is overcome.
- Changes made to the structure of the data have little effect on existing programs.
- Ad-hoc / complex queries can be more easily made as the DBMS will have a query language/ QBE form.
- Unproductive maintenance is eliminated as changes only need to be made once (rather than changing multiple programs).
- Fields can be added or removed without any effect on existing programs (that do not use these fields).
- Security / privacy of the data is improved as each application only has access to the fields it needs.
- There is better control of data integrity as the DBMS (uses its Data Dictionary) to perform validation checks on data entered.

(b) (i) Two points from:

[2]

- The Primary Key in **CLASS** is ClassID
- The Foreign Key of **CLASS-GROUP** is ClassID.
- The Primary Key of **CLASS** is also included in **CLASS-GROUP** as a Foreign Key, (which links to **CLASS** table)

(ii) Many-to-one

[1]

(iii) One mark per statement. Several statements may be on the same line.

[4]

```
SELECT StudentID, FirstName
FROM STUDENT
WHERE TutorGroup = "10B" // WHERE (TutorGroup = "10B")
ORDER BY LastName ASC;
```

Page 9	Mark Scheme	
	Cambridge International AS/A Level – May/June 2016	



(iv) **One mark** per statement. Several statements may be on the same line.

```
SELECT STUDENT.LastName  
FROM STUDENT, CLASS-GROUP  
WHERE ClassID = "CS1" // WHERE (ClassID = "CS1")  
AND CLASS-GROUP.StudentID = STUDENT.StudentID;
```

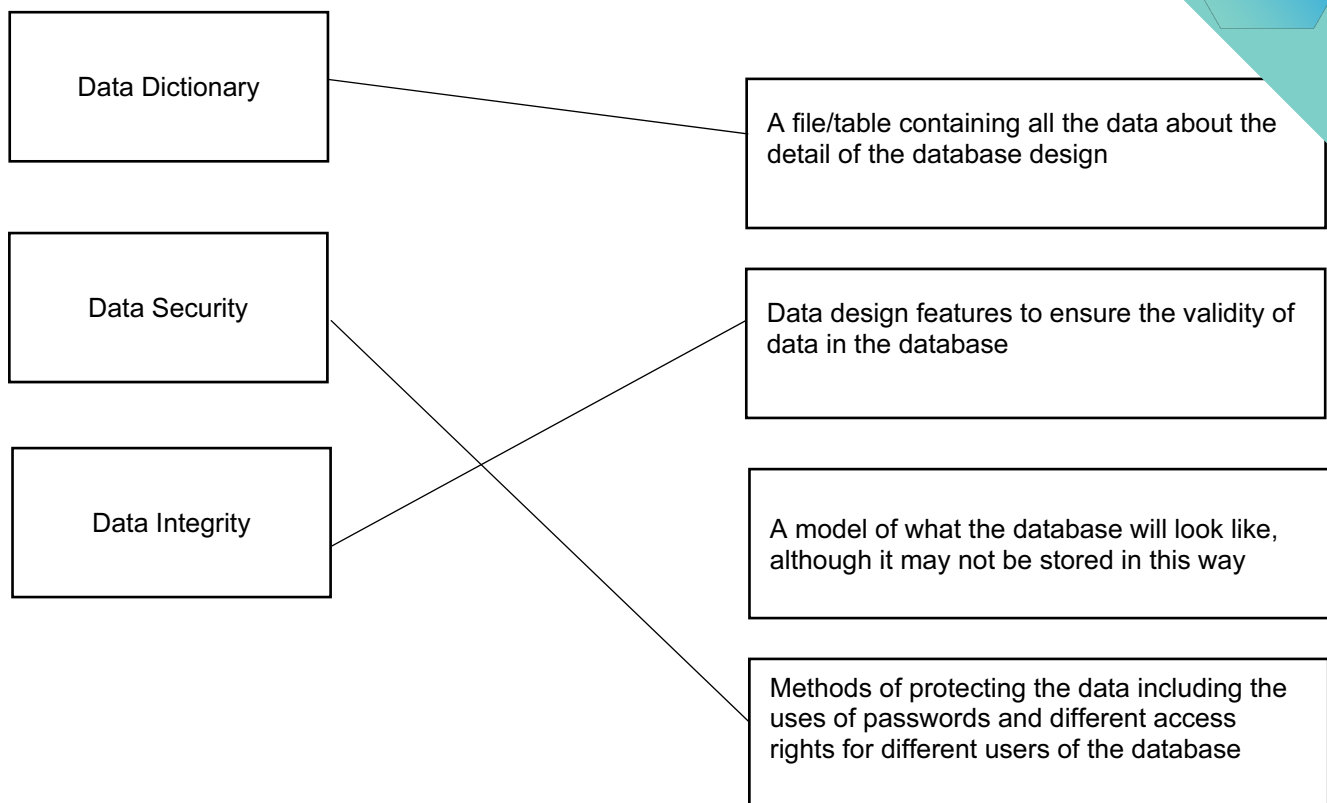
One mark per statement. Several statements may be on the same line.

```
SELECT STUDENT.LastName  
FROM STUDENT INNER JOIN CLASS-GROUP  
ON CLASS-GROUP.StudentID = STUDENT.StudentID  
WHERE ClassID = "CS1" // WHERE (ClassID = "CS1").
```

QUESTION 5.



5 (a) One mark for each correct line.



(b) One mark for procedure point, one mark for justification.

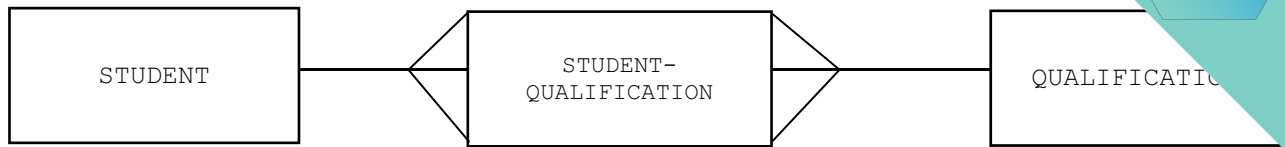
[6]

Maximum **three** procedures.

- How often should the data be backed up? e.g. at the end of each day
- Justification e.g. student's progress may be edited each day and should not be lost
- What medium should the data be backed up to? e.g. external hard disk drive
- Justification e.g. it has large enough capacity
- Where should the backups be stored? e.g. off-site
- Justification e.g. so if the building is damaged only the original data are lost
- What is backed up? e.g. only updated files ...
- Justification e.g. There are a large number of files and they are not all updated each day
- When should the backup take place? e.g. overnight
- Justification e.g. the system is not likely to be used then
- Who is responsible for performing the backup?
- Justification e.g. otherwise it may not be done
- Make sure the procedure is written down and understood by staff
- Justification e.g. otherwise some data may not be backed up



(c) (i) One mark for each correct relationship.



(ii) One-to-many [1]

(iii) Two points from: [2]

- The primary key in the QUALIFICATION table is QualCode.
- The foreign key in the STUDENT-QUALIFICATION table is QualCode.
- The primary key of QUALIFICATION is also included in QualCode.

(d) (i) One mark per statement. Several statements may be on one line. [2]

```

ALTER TABLE STUDENT
ADD DateOfBirth DATE;
    
```

(ii) One mark per statement. Several statements may be on one line. [3]

```

SELECT StudentID, Grade, DateOfAward
FROM STUDENT-QUALIFICATION
WHERE QualCode = 'SC12';
    
```

(iii) One mark per statement. Several statements may be on one line. [4]

```

SELECT STUDENT.FirstName, STUDENT.LastName, STUDENT-
    QUALIFICATION.QualCode
FROM STUDENT, STUDENT-QUALIFICATION
WHERE STUDENT-QUALIFICATION.Grade = 'A'
AND STUDENT.StudentID = STUDENT-QUALIFICATION.StudentID;
    
```

Alternative answer:

```

SELECT FirstName, LastName, STUDENT-QUALIFICATION.QualCode
FROM STUDENT, INNER JOIN STUDENT-QUALIFICATION
ON STUDENT.StudentID = STUDENT-QUALIFICATION.StudentID
WHERE Grade = 'A';
    
```

QUESTION 6.



2 (a) Any **two** from:

- DRAM has to be refreshed / charged
// SRAM does not request a refresh
- DRAM uses a single transistor and capacitor
// SRAM uses more than one transistor to form a memory cell
// SRAM has more complex circuitry
- DRAM stores each bit as a charge
// SRAM each bit is stored using a flip-flop / latch
- DRAM uses higher power(because it requires more circuitry for refreshing)
// SRAM uses less power (no need to refresh)
- DRAM less expensive (to purchase / requires fewer transistors)
// SRAM is more expensive (to buy as it requires more transistors)
- DRAM has slower access time / speed (because it needs to be refreshed)
// SRAM has faster access times
- DRAM can have higher storage / bit / data density
// SRAM has lower storage / bit / data density
- DRAM used in main memory
// SRAM used in cache memory

[2]

Page 4	Mark Scheme
	Cambridge International AS/A Level – October/November 2016



(b) (i) Any **two** from

- The hardware is unusable without an OS // hides complexity of hardware from user
- Acts as an interface / controls communications between user and hardware / hardware and software
- Provides software platform / environment on which other programs can be run [2]

(ii) Any **two** from:

- Process / task / resource management
- Main memory management
- Peripheral / hardware / device management
- File / secondary storage management
- Security management
- Provision of a software platform / environment on which other programs can be run – only if not given in part (b)(i)
- Interrupt handling
- Provision of a user interface run – only if not given in part (b)(i) [2]

(c) Any **two** from:

- A DLL file is a shared library file
- Code is saved separately from the main .EXE files
- Code is only loaded into main memory when required at run-time
- The DDL file can be made available to several applications (at the same time) [2]

QUESTION 7.

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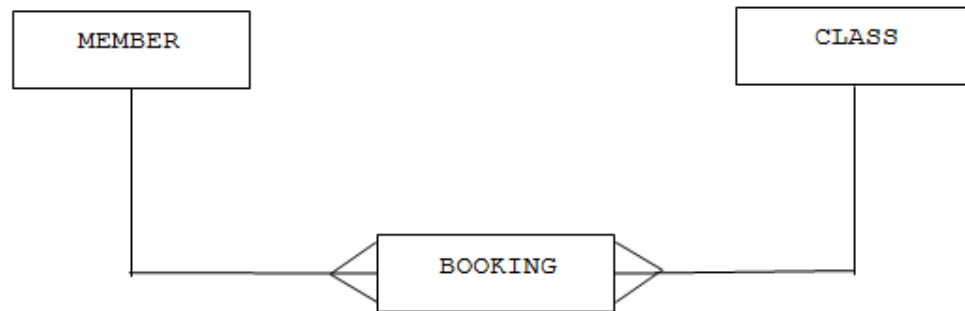
9 (a) **ONE** mark for each reason and **ONE** mark for a further explanation. **MAX THREE**

- Reduced data redundancy / data duplication
- Data is stored in (separate) linked tables
- The database (generally) stores data only once / data need only be updated once
- Improved data consistency / integrity / associated data will be automatically updated / easier to maintain the data / elimination of unproductive maintenance
- Complex queries can be more easily written
- To search / find specific data // specific example related to the Health Club
- Fields can be more easily added to or removed from tables
- Without affecting existing applications (that do not use these fields)
- Program-data dependence is overcome
- Changes to the data (design) do not require changes to programs // changes to programs do not require changes to data // the data can be accessed by any appropriate program
- Security is improved
- Each application only has access to the fields it needs // different users can be given different access rights
- Different users can be given different views of the data / data privacy is maintained
- So they do not see confidential information
- Allows concurrent access
- Record locking prevents two users updating the same record at the same time // record locking assures data consistency

[6]



(b) **ONE** mark for each correct relationship as shown.



[2]

(c) An example of a script is shown, but different syntax may be used.

```

CREATE TABLE CLASS (
    ClassID VARCHAR(5),
    Description VARCHAR(30),
    StartDate DATE,
    ClassTime TIME,
    NoOfSessions INT,
    AdultsOnly BIT,
    PRIMARY KEY(ClassID)
);
    
```

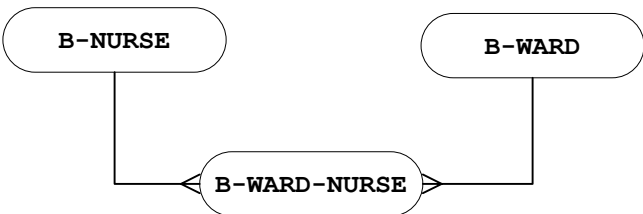
Mark as follows:

- 1 mark** for CREATE TABLE CLASS and ();
- 1 mark** for PRIMARY KEY(ClassID)
- 1 mark** for both ClassID VARCHAR(5), and Description VARCHAR(30),
- 1 mark** for both StartDate DATE, and ClassTime TIME,
- 1 mark** for NoOfSessions INT,
- 1 mark** for AdultsOnly BIT,

[6]

QUESTION 8.



Question	Answer		
1(a)	Many-to-one		
1(b)(i)	A-NURSE (<u>NurseID</u> , FirstName, FamilyName, WardName)		
1(b)(ii)	- The primary key <u>WardName</u> in the A-WARD table links to the foreign key <u>WardName</u> in the A-NURSE table.	1 1	
1(c)(i)	Many-to-many relationship		1
1(c)(ii)	B-WARD-NURSE (<u>WardName</u> , <u>NurseID</u>) Both attributes (with no additions) Joint primary key correctly underlined	1 1	2
1(c)(iii)	 Correct relationship between B-NURSE and B-WARD-NURSE Correct relationship between B-WARD and B-WARD-NURSE	1 1	2
1(d)(i)	<pre>SELECT NurseID, FamilyName FROM B-NURSE WHERE Specialism = 'THEATRE';</pre>	1 1 1	3
1(d)(ii)	<pre>UPDATE B-NURSE SET FamilyName = 'Chi' WHERE NurseID = '076';</pre>	1 1 1	3



Question	Answer														
2(a)(i)	<table><tr><td>1</td><td>A laser beam and a rotating mirror are used to draw an image of the page on the photosensitive drum.</td></tr><tr><td>2</td><td>C // The image is converted on the drum into an electrostatic charge.</td></tr><tr><td>3</td><td>Electrostatic charge attracts toner.</td></tr><tr><td>4</td><td>The charged paper is rolled against the drum.</td></tr><tr><td>5</td><td>D // The oppositely-charged paper picks up the toner particles from the drum. After picking up the toner, the paper is discharged to stop it clinging to the drum.</td></tr><tr><td>6</td><td>A // The paper passes through a fuser, which heats up the paper. The toner melts and forms a permanent image on the paper.</td></tr><tr><td>7</td><td>B // The electrical charge is removed from the drum and the excess toner is collected.</td></tr></table>	1	A laser beam and a rotating mirror are used to draw an image of the page on the photosensitive drum.	2	C // The image is converted on the drum into an electrostatic charge.	3	Electrostatic charge attracts toner.	4	The charged paper is rolled against the drum.	5	D // The oppositely-charged paper picks up the toner particles from the drum. After picking up the toner, the paper is discharged to stop it clinging to the drum.	6	A // The paper passes through a fuser, which heats up the paper. The toner melts and forms a permanent image on the paper.	7	B // The electrical charge is removed from the drum and the excess toner is collected.
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6	A // The paper passes through a fuser, which heats up the paper. The toner melts and forms a permanent image on the paper.														
7	B // The electrical charge is removed from the drum and the excess toner is collected.														
C in the correct place DA,	1 1														

QUESTION 9.



Question	Answer																		
1(a)	Many-to-many relationship																		
1(b)(i)	 Both entities correctly labelled 1 Correct relationship between SHOP and SHOP-SUPPLIER 1 Correct relationship between SUPPLIER and SHOP-SUPPLIER 1																		
1(b)(ii)	<table border="1"> <thead> <tr> <th>Table</th><th>Primary key</th><th>Foreign keys(s) (if any)</th><th>Explanation</th></tr> </thead> <tbody> <tr> <td>SHOP</td><td>ShopID</td><td>None</td><td></td></tr> <tr> <td>SUPPLIER</td><td>SupplierID</td><td>None</td><td></td></tr> <tr> <td>SHOP-SUPPLIER</td><td>ShopID AND SupplierID</td><td>ShopID OR SupplierID (or both)</td><td>To create a link with the SHOP or SUPPLIER table.</td></tr> </tbody> </table> - SHOP has primary key ShopID and SUPPLIER has primary key SupplierID 1 - SHOP-SUPPLIER has primary key ShopID + SupplierID 1 - Both SHOP and SUPPLIER show foreign key as 'None' 1 - SHOP-SUPPLIER shows foreign key ShopID or SupplierID 1 - Explanation for SHOP-SUPPLIER foreign key describes ShopID or SupplierID creating a link 1	Table	Primary key	Foreign keys(s) (if any)	Explanation	SHOP	ShopID	None		SUPPLIER	SupplierID	None		SHOP-SUPPLIER	ShopID AND SupplierID	ShopID OR SupplierID (or both)	To create a link with the SHOP or SUPPLIER table.	5	
Table	Primary key	Foreign keys(s) (if any)	Explanation																
SHOP	ShopID	None																	
SUPPLIER	SupplierID	None																	
SHOP-SUPPLIER	ShopID AND SupplierID	ShopID OR SupplierID (or both)	To create a link with the SHOP or SUPPLIER table.																
1(b)(iii)	Two from: - The database user will <u>frequently</u> want to search on contact name 1 - The contact name attribute has been indexed 1 - It allows for a <u>fast/faster</u> search using contact name 1	Max 2																	
1(c)(i)	SELECT ShopID, Location FROM SHOP WHERE RetailSpecialism = 'GROCERY';	1 1 1	3																
1(c)(ii)	INSERT INTO SHOP-SUPPLIER (ShopID, SupplierID) VALUES (8765, 'SUP89');	1 1 1	3																

QUESTION 10.

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)		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																																											
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																																											
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																																													



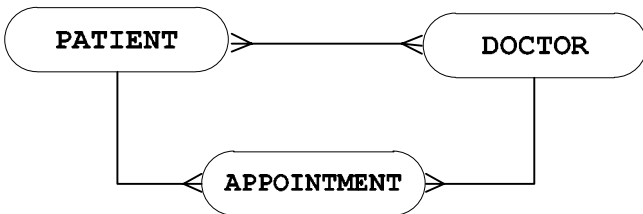
Question	Answer																															
4(a)	A – System clock B – Control unit C – Main memory E – Control bus F – Data bus																															
4(b)	<table border="1"> <thead> <tr> <th>ACC</th><th>CountDown</th><th>OUTPUT</th></tr> </thead> <tbody> <tr> <td></td><td>15</td><td></td></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																															
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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 11.



7(b)	1 Mark for correct answer Add attribute <code>VisitReportText</code> to table <u>VISIT</u>	1
7(c)(i)	1 Mark for each correct line <code>UPDATE CLIENT</code> <code>SET ClientName = 'Albright Holdings'</code> <code>WHERE ClientName = 'ABC Holdings';</code>	3
7(c)(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>VISIT</code> and <code>INTERVIEW</code> tables / other tables with client name ABC Holdings • The <code>ClientName</code> in the <code>VISIT</code> and <code>INTERVIEW</code> tables / other tables might not be automatically updated • Records in the <code>VISIT</code> and <code>INTERVIEW</code> tables / other tables will become orphaned	2



Question	Answer	
7(d)	1 Mark for each correct line SELECT StaffID FROM INTERVIEW WHERE ClientName = 'New Age Toys' AND VisitDate = '13/10/2016'; (Accept clauses other way round)	
7(e)	1 Mark for a correct answer Add a suitable attribute, for example, EuropeTraveller to the <u>STAFF</u> table // Add a suitable attribute, for example, Country to the <u>CLIENT</u> table	1

QUESTION 12.



Question	Answer	Marks
7(a)	1 mark for each correct join <pre> graph TD MOVIE[MOVIE] --- MOVIESCHEDULE[MOVIESCHEDULE] SCREEN[SCREEN] --- MOVIESCHEDULE style MOVIESCHEDULE fill:none,stroke:#f00 </pre>	2
7(b)	1 mark per bullet point • MovieID is the Primary Key in MOVIE • ... <u>links to</u> MovieID which is the Foreign Key in MOVIESCHEDULE • ScreenNumber is the Primary Key in SCREEN • ... <u>links to</u> ScreenNumber which is the Foreign Key in MOVIESCHEDULE	4
7(c)	1 mark per bullet point • ALTER TABLE MOVIE • ADD (COLUMN) ProductionCompany VARCHAR(25);	2



Question	Answer
7(d)	1 mark per bullet point Answer 1: • <code>SELECT Title, Rating</code> • <code>FROM MOVIE, MOVIESCHEDULE</code> • <code>WHERE MOVIE.MovieID = MOVIESCHEDULE.MovieID</code> • <code>AND MOVIESCHEDULE.ScreenNumber = 3;</code> Or Answer 2: • <code>SELECT Title, Rating</code> • <code>FROM MOVIE INNER JOIN MOVIESCHEDULE</code> • <code>ON MOVIE.MovieID = MOVIESCHEDULE.MovieID</code> • <code>WHERE MOVIESCHEDULE.ScreenNumber = 3;</code>

QUESTION 13.



Question	Answer	Marks
3(a)(i)	1 mark for each advantage, 1 mark for a valid expansion to max 2 × 2 • Code is already tested • ...so it is more robust/likely to work • Saves programming time • ...code does not have to be written/re-written from scratch • The programmer can use e.g. mathematical functions • ...that s/he may not know how to code • If there is an improvement in the library routine • ...the program updates automatically	4
3(a)(ii)	1 mark per bullet point to max 2 • A collection of self-contained (shared library) programs • ...that are already compiled • Linked to the main program during execution • Library program code is separate from the .EXE file • Library file only loaded into memory when required at run time • A DLL file can be made available to several applications (at the same time) • If DLL routine is updated the program that uses it will run the update	2
3(b)(i)	1 mark per bullet point to max 1 • Errors can be corrected as they occur • Can run a partially complete program when developing • The effect of any change made to the code can be seen immediately	1



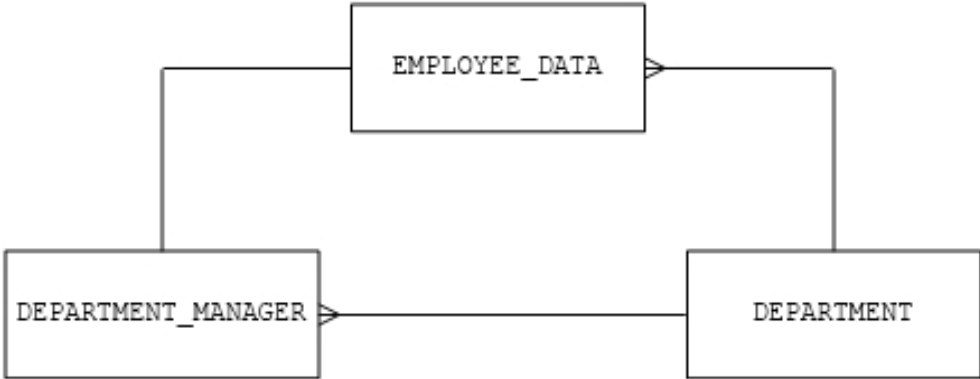
Question	Answer
3(b)(ii)	1 mark per bullet point to max 3 • Produces an executable file • User does not have access to source code • It will (probably) be faster to run the executable • Code does not have to be compiled each time it is run • Does not need the compiler to be present at run-time

QUESTION 14.



Question	Answer	Marks
3(a)(i)	1 mark per bullet point • Stores all the information about the database // data about the data // metadata about the data • For example, fields, data types, validation, keys	2
3(a)(ii)	1 mark per bullet point to max 2 • Allows the user to enter criteria • Searches for data which meets the entered criteria • Organises the results to be displayed to the user	2
3(b)	1 mark per bullet point to max 2 • Primary key uniquely identifies each tuple // Each tuple in the table is unique • Primary key can be used as a foreign key in another table • to form a link/relationship between the tables By example: • Identification of a primary key in a table • Describing <u>that</u> primary key in another table as a foreign key	2



Question	Answer	
3(c)	1 mark for each correct link 	
3(d)	1 mark per bullet point to max 3 • There are no repeating groups (1NF) • There are no partial dependencies (2NF) • There are no non-key dependencies // There are no transitive dependencies (3NF)	3
3(e)(i)	1 mark for correct answer <pre>CREATE DATABASE EMPLOYEES;</pre>	1
3(e)(ii)	1 mark per bullet • Create table <code>EMPLOYEE_DATA</code> with open and close brackets • <code>EmployeeID</code> as <code>VarChar</code> restricted to max 7, <code>Gender</code> as a <code>VarChar</code> restricted to max 6, <code>DepartmentNumber</code> as a <code>VarChar</code> restricted to max 2 • <code>FirstName</code> and <code>LastName</code> as <code>VarChar</code> (any max lengths must be reasonable) • <code>Date of birth</code> as <code>Date</code> • Declaring <code>EmployeeID</code> as PK <pre>CREATE TABLE EMPLOYEE_DATA (EmployeeID VarChar(7), FirstName VarChar, LastName VarChar, DateOfBirth Date, Gender VarChar(6), DepartmentNumber VarChar(2), PRIMARY KEY (EmployeeID));</pre>	5



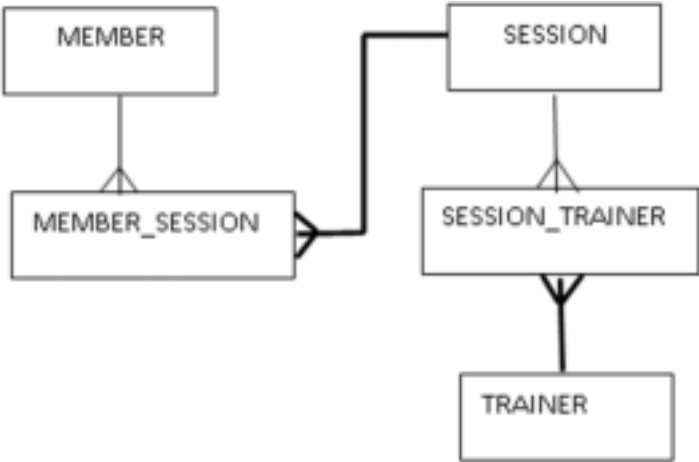
Question	Answer
3(e)(iii)	1 mark per bullet • Select FirstName and LastName only • From both tables • Where DepartmentName = "Finance" • AND Gender = "Female" • Joining tables (either AND, or inner join) <pre>SELECT FirstName, LastName FROM EMPLOYEE_DATA, DEPARTMENT WHERE DepartmentName = "Finance" AND Gender = "Female" AND DEPARTMENT.DepartmentNumber = EMPLOYEE_DATA.DepartmentNumber;</pre>

QUESTION 15.



Question	Answer	Marks
4(a)(i)	1 mark per bullet point, max 3 marks from any group to max 4 • Multiple tables are linked together • ... which eliminates / reduces data redundancy / duplication • ... and increases <u>data</u> integrity / consistency • ... which reduces compatibility issues • ... so data need only be updated once • ... and associated data will be automatically updated // referential integrity can be enforced • ... which eliminates unproductive maintenance // which makes it easier to maintain the data • Program-data independence means that • ... the structure of data can change and does not affect program • ... the structure of programs can change and does not affect data • ... the data can be accessed by any appropriate program • Allows concurrent access to data • ... by the use of record locking • ... by restricting over-writing changes • Complex queries can be more easily written • ... to search / find specific data // specific example related to the sports club • Different users can be given different access rights • ... which improves security • Different users can be given different views of the data • ... so they do not see confidential information • ... and data privacy is maintained • ... accept a valid example related to the sports club	4
4(a)(ii)	1 mark for each word in the correct position For a database to be in First Normal Form (1NF) there must be no repeating groups of attributes. For a database to be in Second Normal Form (2NF), it must be in 1NF, and contain no partial key dependencies. For a database to be in Third Normal Form (3NF), it must be in 2NF, and all attributes must be fully dependent on the primary key.	4



Question	Answer	
4(b)(i)	1 mark for SESSION to MEMBER_SESSION (one-to-many) 1 mark for TRAINER to SESSION_TRAINER (one-to-many)  <pre> graph TD MEMBER[MEMBER] --> MEMBER_SESSION[MEMBER_SESSION] SESSION[SESSION] --> MEMBER_SESSION SESSION --> SESSION_TRAINER[SESSION_TRAINER] TRAINER[TRAINER] --> SESSION_TRAINER </pre>	
4(b)(ii)	CREATE DATABASE SPORTS_CLUB;	1
4(b)(iii)	1 mark per bullet point • CREATE TABLE SESSION and (); • SessionID as char(4) / varchar / varchar(4) / text and Description as varchar / varchar(x) / char(x) / text • SessionDate as date and SessionTime as time • NumberMembers as integer / integer(2) / int / int(2) • SessionID set as a Primary Key Example 1: CREATE TABLE SESSION(SessionID Char(4), Description Varchar, SessionDate Date, SessionTime Time, NumberMembers Integer, PRIMARY KEY (SessionID)); Example 2: CREATE TABLE SESSION(SessionID Char(4) <u>NOT NULL</u> PRIMARY KEY, Description Varchar, SessionDate Date, SessionTime Time, NumberMembers Integer);	5



Question	Answer
4(b)(iv)	1 mark per bullet point • <code>Select FirstName and comma and LastName</code> • <code>From MEMBER</code> • <code>Where MembershipType = "Peak"</code> <code>SELECT FirstName, LastName</code> <code>FROM MEMBER</code> <code>WHERE MembershipType = "Peak";</code>

QUESTION 16.



Question	Answer	Marks
3(a)(i)	1 mark per table • CUSTOMER table has at least customer ID, customer name, address and contact details • ROOM has at least room number, room type, • BOOKING has at least booking ID, room number, customer ID, start date, number of nights CUSTOMER (<u>CustomerID</u>, Name, Address, ContactDetails) ROOM (RoomNumber, RoomType) BOOKING (BookingID, RoomNumber, CustomerID, StartDate, NumberNights)	3



Question	Answer		
3(a)(ii)	1 mark for 1 or 2 correct Primary Keys, 2 marks for 3 correct Primary Keys CUSTOMER: CustomerID ROOM: RoomNumber BOOKING: BookingID		
3(a)(iii)	1 mark for both table name and Foreign Key Table: BOOKING Foreign Key: CustomerID / RoomNumber		
3(b)	1 mark per bullet point to max 2 plus 1 mark for suitable example for each DBMS tool Developer Interface - To create user friendly features e.g. forms to enter new bookings - To create outputs e.g. report of bookings on a given date - To create interactive features e.g. buttons and menus Query processor - To create SQL/QBE queries - To search for data that meets set criteria, e.g. all bookings for next week - To perform calculations on extracted data, e.g. number of empty rooms tomorrow		
3c	1 mark for at least two correct rows, 2 marks for all four correct rows		
	Script	DDL	DML
	CREATE TABLE FILMS	✓	
	SELECT FilmID FROM FILMS		✓
	ALTER TABLE FILMS ADD PRIMARY KEY (FilmID)	✓	
	CREATE DATABASE MYDATA	✓	