**Section 1: Short Answer 40%()**

This section contains **20** questions. You must answer **all** questions. Write your answers in the spaces provided.

Spare pages are included at the end of this booklet. They can be used for planning your responses and/or as additional space if required to continue to answer.

* Planning: If you use the spare pages for planning, indicate this clearly at the top of the page.
* Continuing an answer: If you need to use the space to continue an answer, indicate in the original answer space where the answer is continued, i.e. give the page number. Fill in the number of the question that you are continuing to answer at the top of the page.

Suggested working time: 70 minutes.

Questions 1 and 2 refer to information contained in the following scenario.

Melanie has stored the years daily temperatures in degrees Fahrenheit. Unfortunately, the area manager requires the temperatures to be in Celsius. The formula to convert is (C is reading in Celsius and F is for reading in Fahrenheit)

**C = (F-32) x 5/9**

**Question 1 (5 marks)**

Complete the algorithm required to write all the Fahrenheit readings in this array to new array storing the temperatures in Censius.

|  |  |
| --- | --- |
| **Key** | **Marks** |
| Initialize counter | 1 |
| For counter in range or below an integer value | 2 |
| Correct application of formula to arrays | 2 |
| Begin/end | 1 |
| **Total** | **5** |
| **Possible answer**  Begin  i 0  For i <365  Celsius[i] (Fahrenheit[i] -32) \*5/9  i i+1  end for  end |  |

|  |  |
| --- | --- |
|  |  |

**Question 2 (12 marks)**

Write the algorithm that will print both the maxima and minima from one of the temperature arrays.

|  |  |
| --- | --- |
| Key | Marks |
| Initialize counter | 1 |
| For counter in range or below an integer value | 2 |
| Correct application of formula to arrays | 3 |
| Begin/end | 1 |
| **Total x 12 above** | **12** |
| **Possible answer**  Begin  i 0  Max array[0]  For i <365  If array[i] > Max  Max Array  i+1  end for      i 0  Min array[0]  For i <365  If array[i] > Max  Min Array  i+1  end for  Print Min, Max  end |  |

**Question 3 (8 marks)**

List two advantages and two disadvantages associated with compilers and interpreters.

|  |  |
| --- | --- |
| **Key** | **Marks** |
| Lists two advantages and 2 disadvantages for a compiler | 4 |
| List two advantages and 2 disadvantages for an Interpreter | 4 |
|  | **8** |
| **Possible answer** |  |

|  |  |  |
| --- | --- | --- |
| **Translator** | **Advantages** | **Disadvantage** |
| **Compiler** | Advantage 1: *Code runs quickly once compiled* | Disadvantage 1: *Can be slow to translate* |
| Advantage 2: *Difficult to modify as access code not available* | Disadvantage 2:*Difficult to debug* |
| **Interpreter** | Advantage 1: *Easier to debug as it runs line by line – better at picking up syntax issues* | Disadvantage 1:*Code executes more slowly* |
| Advantage 2:*easier to modify and it is more portable and can run on any machine* | Disadvantage 2:*needs an interpreter and it takes up space.* |

Questions 4 and 5 relate to the following code.

**Program: HouseLoan**

Var HousePrice, TotalHousePrice, StampDuty:Real

CalcStampDuty(HousePrice, StampDuty)

Begin

StampDuty (0.1xHousePrice)

End

CalcSettlementFee(HousePrice)

HousePrice \*0.05

Return

CalcLoanAmount(TotalHousePrice)

Var: Deposit, LoanAmount:real

Begin

Input(Deposit)

LoanAmount TotalHousePrice – Deposit

Output(LoanAmount)

End

Begin

Input(HousePrice)

CalcStampDuty(HousePrice, StampDuty)

TotalHousePrice HousePrice +Stampduty+ CalcSettlementFee(HousePrice)

CalcLoanAmount(TotalHousePrice)

End

**Question 4 (8 marks)**

1. Identify a function within this program.

|  |  |
| --- | --- |
| **Key** | **Marks** |
| Correctly identifies CalcSettlementFee(HousePrice) as a function | 1 |
|  |  |
|  | **1** |

1. Identify the local variables in this program (2 marks)

|  |  |
| --- | --- |
| **Key** | **Marks** |
| Correctly identifies LoanAmount and Deposit | 2 |
|  |  |
|  | **2** |

1. Identify a variable that is global (1 mark)

|  |  |
| --- | --- |
| **Key** | **Marks** |
| Correctly identifies HousePrice as global | 1 |
|  |  |
|  | **1** |

1. Discuss why is often not considered good coding to use global variables**.** (3 marks)

|  |  |
| --- | --- |
| **Key** | **Marks** |
| Discusses why global variables are not considered good coding by referring to two issues associated with global variables | 2-3 |
| States a reason why global variables not good coding | 1 |
| **Total** | **3** |
| **Possible Answer**  If you want to take the module to use in another program, you need to take the global variable with you. So the module is not fully portable. If you are part of a team, other members can change the global variable so it becomes harder to control. When testing and debugging a function/module, it becomes more difficult when global variables are used. |  |

1. Explain how would you change CalcLoanAmount to convert it to a function? (2 marks)

|  |  |
| --- | --- |
| **Key** | **Marks** |
| Correctly explains how to convert to a module by linking to function characteristics | 1-2 |
| **Total** | **2** |
| **Possible Answer**  A function does not have any input or output statements. To convert this module to a function, the variable Deposit would need to be passed into the function rather than be input within the scope of the function. |  |

**Question 5 (9 marks)**

Create a Structure Chart that shows the modules and the flow of parameters below.

|  |  |
| --- | --- |
| **Key** | **Marks** |
| Main module | 1 mark |
| CalcStampDutyModule with correct parameter flow | 3 |
| CalcSettlementfee with correct parameter flow | 3 |
| CalcLoanAmt with correct parameter flow | 2 |
| **Possible Answer** |  |

**Question 6 (8 marks)**

Explain why a router can have up to four different functions within a home environment.

|  |  |
| --- | --- |
| **Key** | **Marks** |
| Identifies four functions | 0-4 marks |
| Explains why a home router has these functions | 0-4 |
| **Total** | 8 |
|  |  |
| **Possible Answer**  Within in the home environment, the router needs to connect home devices directly to the internet so will have a modem built in or attached to the **router.** The router will also have the ports required to attach wired devices to the internet and therefore acts as a **switch** to create the LAN in the first instance. Because this is the entry point into a home and a security vulnerability, a router will often have a **firewall** function built in. Also a home router will act as a **wireless access poin**t to distribute access to the internet for wireless devices being used within the home. A home router can also act as a **DHCP server** and store as well as allocate IP addresses to devices accessing the network. |  |

**Question 7 (3 marks)**

Discuss the differences between single mode and multimode fibre-optic cable.

|  |  |
| --- | --- |
| **Key** | **Marks** |
| Identifies and discusses over two differences | 3 marks |
| Identifies and discusses a difference | 2 |
| Identifies a difference – little discussion | 1 |
| **Total** |  |
| **Possible Answer**  Single mode means one type of light generated at one time. Multimode means multiple. Single mode has a much smaller diameter compared to multimode. Single mode’s light stream does not reflect as much as multimode so it is not as susceptible to attenuation or degrading of the signal. |  |

**Question 8 (7 marks)**

1. Explain what a Distributed Denial of Service Attack (DDoS) is and discuss the impact it could have on a network. (3 marks)

|  |  |
| --- | --- |
| **Key** | **Marks** |
| Explains fully what a DDoS attack is and the impact it has on a network | 3 marks |
| Explains what a DDos attack is | 2 |
| States what a DDoS attack is. | 1 |
| **Total** |  |
| **Possible Answer**  A distributed denial of service occurs when there is an attempt to render internet services unavailable to its users. This is done via **multiple** machines or bots that have had software to install to flood the website with unsolicited messages and overwhelm the system. It is often done to big websites and it is thought the last census experienced this type of hack and crashed the system completely to the users. |  |

1. Discuss what can be done to ensure a network is protected against a DDoS attack.

(4 marks)

|  |  |
| --- | --- |
| **Key** | **Marks** |
| Identifies and discusses two measures to potentially prevent DDoS atacks | 3-4 marks |
| Identifies and discusses a measure to prevent a DDoS attack | 2 |
| Identifies a measure – little discussion. | 1 |
| **Total** | 4 |
| **Possible Answer**  To prevent a DDoS attack, users must be made aware of the dangers of accidentally installing bot type software by opening emails with attachment and executing these malicious programs. The organization itself can adjust the firewall rules to prevent messages entering the network in the first instance but this does not always work and is retrospective. It is quite difficult to stop a concerted DDoS attack and the measures may be onerous such as buying more bandwidth or building redundancy by have the website copied over to another server. |  |

**Question 9 (1 mark)**

What sort of errors are identified in a trace table?

|  |  |
| --- | --- |
| **Key** | **Marks** |
| Correctly identifies that a trace table can help identify logic errors | 1 mark |

**Question 10 (15 marks)**

Complete a trace table for the following code for numbers 16, 40 and then 15, 41.

Begin

Num1 Input

Num2 Input

While Num1 != Num2

If Num1 > Num2 then

Num1 Num1-Num2

Else

Num2 Num2-Num1

End if

End while

Output Num1,Num2

End

|  |  |
| --- | --- |
| **Key** | **Marks** |
| Completes the trace for the variables and  Enters both sets correctly (line 2 and 3) | 4 marks |
| Correctly traces condition | 1 mark |
| Correctly traces if and else  First set (correctly traces to 8 and exits)  Second set (correctly traces to 1 and exits)  Output | 2 marks  6 marks  2 |
| **Total** | **15 Marks** |
| **Possible Answer**  **First numbers**   |  |  |  |  | | --- | --- | --- | --- | | **Num1** | **Num2** | **Num1!=Num2** | **output** | | 16 | 40 | Y |  | |  | 24 | Y |  | |  | 8 | Y |  | | 8 |  | n | 8,8 | |  |  |  |  | | 15 | 41 | Y |  | |  | 26 | Y |  | |  | 11 | Y |  | | 4 |  | Y |  | |  | 7 | Y |  | |  | 3 | Y |  | | 1 |  | Y |  | |  | 2 | Y |  | |  | 1 | N | 1,1 | |  |

**Question 11 (4 marks)**

Explain how and why data is stored in a systems cache memory

|  |  |
| --- | --- |
| **Key** | **Marks** |
| Fully explains the how (location, size, counter, levels) and why the data is stored in a systems cache memory (speed, efficiency) | 4 |
| Superficially explains how and why | 3 |
| Explains how or why | 2 |
| Superficial statement | 1 |
|  | **4 marks** |
| **Possible Answer**  A systems cache is located on or near the CPU. Level 1 and 2 are likely to be on the CPU and Level 3 next to. The size of the cache increases with the number and all three store frequently used instructions. A cache counter will essentially count the number of times an instruction is fetched and either bump it up or down the cache levels. Because of its proximity to the cpu and its small size, fetching instructions from the cache is a lot quicker and makes the system more efficient. |  |

**Question 12 (2 marks)**

Discuss why protocols are needed in network communications.

|  |  |
| --- | --- |
| **Key** | **Marks** |
| Discusses the need for protocols in regard to network communications | 2 |
| States what a protocol is. | 1 |
|  | **2 marks** |
| **Possible Answer**  Because networks are made of different machines that send and receive packets along different media and from other different machines in a network, protocols are requires to establish rules and ensure that messages can be delivered and interpreted. Without these rules, there may not be any information exchange within a network |  |

**Question 13 (8 marks)**

Identify protocols from the Transmission Control Protocol/Internet Protocol (TCP/IP) suite to describe how each layer of the TCP/IP model facilitates network communications.

|  |  |
| --- | --- |
| **Key** | **Marks** |
| Identifies a protocol from each layer and uses it to describe how each layer operates in relation to network communications | 7-8 |
| Identifies a protocol from most layers and uses it to describe how each layer operates in relation to network communications | 5-6 |
| Identifies a protocol from half the layers and uses it to describe how each layer operates in relation to network communications | 3-4 |
| Identifies a protocol from one layer and uses it to describe how the layer operates in relation to network communications | 1-2 |
|  | **8 marks** |
| **Possible Answer**  Application: A protocol that operates at this layer is the SMTP protocol which generates an email. At this level, the application will bundle the message up for transport  Transport: The TCP protocol operates on this layer and is responsible for bundling the packet up into different packets and attaching a header that identifies the session that allows the data to be sent to the appropriate program or application. It will add the IP address of the sender  Networking: The IP protocol operates at this level and attaches more information to the Header that concerns the IP address of the receiving machine.  Physical/Datalink: This is the how the packets are physically transmitted. This could be 802.11 or 802.3 protocols. |  |
|  |  |

**Question 14 (6 marks)**

Identify two activities that take place in the Software Development Cycle in the following stages:

Design data and algorithms:

Debug syntax and logic errors:

Document internally and externally:

|  |  |
| --- | --- |
| **Key** | **Marks** |
| States three characteristics | 3 |
| Describes how they influence choice for both linear and non-linear | 3 |
|  | **4 marks** |
| **Possible Answer** |  |

**Question 15 (2 marks)**

Explain why it is important to test and implement with live data.

|  |  |
| --- | --- |
| **Key** | **Marks** |
| States three characteristics | 3 |
| Describes how they influence choice for both linear and non-linear | 3 |
|  | **4 marks** |
| **Possible Answer** |  |

**Question 16 (2 marks)**

Discuss the difference between pass by value and pass by reference?

|  |  |
| --- | --- |
| **Key** | **Marks** |
| Discusses the difference | 2 |
| States the difference | 1 |
|  | **2 marks** |
| **Possible Answer** |  |

**Question 17 (7 marks)**

Draw an Entity Relationship Diagram (ERD) to represent the following scenarios. Show Primary keys and Foreign keys.

1. Angelo visits a clinic and to see his Doctor at a scheduled appointment time. He has complex needs so will see his Doctor several times. (5 marks)

|  |  |
| --- | --- |
| **Key** | **Marks** |
| 3 primary keys and 2 foreign keys | 5 |
| Cardinality correct and relationships | 2 |
|  | **7 marks** |
| **Possible Answer** |  |

Doctor

1

Has

Appointment

Patient

Has

M

1

M

**Question 18 (3 marks)**

Identify the features of WiMax and discuss the advantages and disadvantages of using WiMax as a communication medium.

|  |  |
| --- | --- |
| **Key** | **Marks** |
| Discusses an advantage and a disadvantage fully and identifies its features | 3 |
| Identify a feature and an advantage and disadvantage | 2 |
| States an advantage or disadvantage and a feature | **1** |
|  | **3 marks** |
| **Possible Answer**  WiMax stands for the Worldwide Operability for Microwave Access and it is a series of standards set up so that this wireless medium can deliver high bandwidth and secure transfer of data. It was used in the 4G mobile phone network but was superceded by other protocols that provided more reliable line of sight performance and high latency levels. |  |
|  |  |

**Question 19 (7 marks)**

In order to keep track of the new software development, Fred has listed the following activities.

|  |  |  |  |
| --- | --- | --- | --- |
| **No** | **Task** | **Duration** | **Dependency** |
| 1 | Discuss needs to client | 1 day |  |
| 2 | Develop Requirements Analysis | 2 days | 1 |
| 3 | Seek feedback from client | 1 day | 2 |
| 4 | Analyse detailed requirements | 1 | 3 |
| 5 | Design the data and algorithms | 4 | 4 |
| 6 | Code data structures and instructions | 3 | 5 |
| 7 | Debug syntax and logic errors | 2 | 6 |
| 8 | Test to meet specifications | 1 | 6,7 |
| 9 | Document internally and externally | 3 |  |
| 10 | Implement and test with live data | 2 | 8,9 |
| 11 | Evaluate performance | 2 | 10 |

Complete a GANTT chart for the project below. (7 marks)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 |
| 1 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 2 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 3 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 4 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 5 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 6 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 7 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 8 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 9 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 10 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 11 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

|  |  |
| --- | --- |
| **Key** | **Marks** |
| Correct duration for tasks (some, most all) | 1-3 |
| Correct dependencies indicated (some, most, all) | 1-3 |
| Correct duration | 1 |
|  | **7 marks** |
| **Possible Answer** |  |

**Question 20 (6 marks)**

Complete the table below identifying three characteristics of a project and discuss how each would help determine which project management methodology to choose.

|  |  |  |
| --- | --- | --- |
| **Characteristic** | **Linear** | **Non-linear** |
|  |  |  |
|  |  |  |
|  |  |  |

|  |  |
| --- | --- |
| **Key** | **Marks** |
| States three characteristics | 3 |
| Describes how they influence choice for both linear and non-linear | 3 |
|  | **6 marks** |
| **Possible Answer**   |  |  |  | | --- | --- | --- | | **Characteristic** | **Linear** | **Non-linear** | | How many are in the project team | Often suited to over 20 people as there is a lot of documentation. This would help keep track of what such a large number of people were up to, | Non-linear – under 20 people as greater than this number may mean issues keeping track as very little documentation is produced | | Client knowledge | If the client is not well versed on the technology then a linear approach may be better as the documentation created will allow tracking and reporting if outcomes are very clear | If the client is knowledgeable then they can become part of the project and manage the development. A high level of knowledge where outcomes are not known or change frequently. | | Safety or legislative framework that is reported to or on | In safety or time critical projects, Linear is better as it produces the documentation a third party enforcer may require | It safety not an issue and time not critical, a linear approach would be a good approach to consider. | |  |

End of section

**Section Two: Extended answer 60% (118 Marks)**

This section has **five (5)** questions. Answer **all** questions. Write your answers in the spaces provided.

Spare pages are included at the end of this booklet. They can be used for planning your responses and/or as additional space if required to continue to answer.

* Planning: If you use the spare pages for planning, indicate this clearly at the top of the page.
* Continuing an answer: If you need to use the space to continue an answer, indicate in the original answer space where the answer is continued, i.e. give the page number. Fill in the number of the question that you are continuing to answer at the top of the page.

Suggested working time: 110 minutes.

Questions 21 through to 25 refer to the Source Booklet

The Global Management Company that now owns Centro City Waves has advised that the organization will be required to computerize and automate the reception functions.

**Question 21 (16 Marks)**

Create a context diagram for the Centro City Waves reception area.

|  |  |
| --- | --- |
| **Key** | **Marks** |
| Entities 1-4 (Instructors, Members *Medical Members opt,* Supervisor*)* | 4 marks |
| **Vectors:**  Instructors  Members/New Members  Supervisor | 1-6  1-5  1-2 |
| Total | 17 |
| Possible Answer  A screenshot of a cell phone  Description automatically generated |  |

**Question 22 (36 Marks)**

Create a Level 0 Data Flow Diagram for the Centro City Waves reception area.

|  |  |
| --- | --- |
| **Key** | **Marks** |
| Entities 1-4(Instructors, Members *Medical Members opt*, Supervisor*) but must balance with Context* | 4 marks |
| **Processes and Vectors (must balance with Context)**   1. Registration process (1 + 3) 2. Entry list (1 + 2) 3. Entry process (1 + 1) 4. Instructor Supervision process (1+4) 5. Instructor payment process (1 + 2) 6. Reports/roster process (1 + 4)   Any of the above processes can be merged or teased out. Check the marks against the context and the Data flows. | 5  3  4  6  4  7 |
| **Datastore**  **With appropriate data stored and used by processes** | 3 |
| Total | 36 |
|  |  |
| Possible Answer  A screenshot of a cell phone  Description automatically generated |  |

**Question 23 (30 Marks)**

The analyst has strongly recommended a Relational Database system be created to manage the Reception System.

1. Justify why a Relational Database Management system would be recommend referring to specific examples within the data. (6 marks)

|  |  |
| --- | --- |
| **Key** | **Marks** |
| Justification: concluding having examined disadvantage and advantage and referencing two examples within the data | 5-6 |
| Concludes referring to disadvantage and an advantage | 3-4 |
| States outcome referring to a characteristic | 0-2 |
| **Possible Answer**  If the business can afford to pay or hire someone to maintain the database then a relational database would be able to created reports and queries to facilitate better decisions based on better quality data if the database is created correctly. For instance, currently there is a lot of doubling up in terms of the entries. The reception holds a copy and the members hold a copy increasing likelihood of loss or inaccurate data if the instructor forgets to tally the members up. Also richer information. Currently the Instructors are not providing data about who is attending their area. This might be useful for decisions and a RDBMs would facilitate storage of this information as it is more efficient. |  |

1. Normalise the data contained in the documents on pages 3 and 4 of the source booklet to third normal form (3NF). Create an Entity Relationship Diagram to represent the normalized data. Show Primary/Foreign keys only. (24 marks)

|  |  |
| --- | --- |
| **Key** | **Marks** |
| Entities with correct cardinality | 0-8 |
| Foreign keys | 0-8 |
| Primary keys | 0-8 |
| **Possible Answer**  **A close up of text on a black background  Description automatically generated** |  |

1. Having undertaken the process of normalization, explain how this improves the database development process. Refer to specific examples within the data. (3 marks)

|  |  |
| --- | --- |
| **Key** | **Marks** |
| Explains with reference to an example within the data | 3 |
| Explains with some linkage to scenaraio | 2 |
| States with no linkage to scenario | 1 |
| **Total** | **3** |
|  |  |
| **Possible Answer**  Normalisation will remove most redundant data and thereby the database will be developed so that information has greater integrity. For instance, repeated data such as the repeated data on the entry form and on the member list. A database will allow both to be created automatically and only refer to one linked source diminishing the chance for error. |  |

**Question 24 (23 Marks)**

1. Each day, reception inputs the number of members attending into a program that stores these daily tallies into an array.

The Total number of members attending and the average daily number of members attending each day is required by the supervisor.

Create the program that will calculate these requirements for the month of October. All variables and data structures must be initialized.

|  |  |
| --- | --- |
| **Key** | **Marks** |
| Variables initialized  Array initialized with for loop | 3  4 |
| Input into the array using for loop and correct counter  Correct Total calculation  Correct average calculation | 2  1  1 |
| Begin/ends of program and structure initialize and input | 4 |
| **Total** | **15** |
|  |  |
| **Possible Answer**  Begin  i, average, total 0  for i < 31  Array[i]  i i + 1  end for  1 0  for i < 31  input(number) Array[i]  total total + 1  i i + 1  end for  average Total/(i-1)  End |  |
|  |  |

1. To assist with rostering, Centro City Waves requires a print-out from their new database that lists the surnames of all instructors who have their Bronze Medallion.

Assume Instructor details and Qualifications details are in two separate tables, write the SQL Query required to produce this report. (4 marks)

|  |  |
| --- | --- |
| **Key** | **Marks** |
| SELECT Instructor.Surname | 2 |
| FROM Instructor, Qualification | 3 |
| WHERE Qualification.Name = “Bronze Medallion” | 3 |
| **Total** | **8** |
|  |  |

**Question 25 (13 Marks)**

As part of the new system, Centro City Waves will transition to a contactless card entry system for members.

1. Describe what contactless card’s are and outline how they work. (3 marks)

|  |  |
| --- | --- |
| **Key** | **Marks** |
| Description | 2 |
| Outline of technology | 1 |
| **Total** | **3** |
| **Possible Answer**  Contactless card entry allows holders to wave or touch their card to a reader and transfer information for the purpose of keyless or contactless entry. The card contains a magnetic strip with a small chip a small antennae coiled into it and a radio frequency is used (RFID) to read the data via an inbuilt scanner into the receiving device. Often used by banks (tap and go) or keyless entry systems. |  |
|  |  |

The newly designed and built database will be located on a server and accessible by all instructors over a WIFI network available throughout the facility.

1. Identify and describe the devices necessary to establish and secure this network.

(6 marks)

|  |  |
| --- | --- |
| **Key** | **Marks** |
| Identifies and describes at least two devices necessary to create the network | 0-4 |
| Discusses a device that can help secure the network | 2 |
| **Total** | **6** |
| **Possible Answer**  Two devices required would be a switch and a wireless access point. The switch would be used to create both the LAN and the WAN in the first instance as it would allow all devices to join the network if they pass security credentials. To secure the network, the Wireless access point should have WPA 2 protocols that encrypts the wireless network and ensures only authorized users can connect via network software installed on the server. A physical firewall can also be installed onto the network to secure it and it’s data from malicious data theft |  |
|  |  |

1. The global owners of Centro City Waves have completed a site visit and have asked why cloud services are not being used to store data. Discuss this in relation to the Centro City Waves system development needs. (4 marks)

|  |  |
| --- | --- |
| **Key** | **Marks** |
| Discussion of why cloud services are not suitable in relation to securing sensitive data with third party provider | 2-3 |
| Statement only of cloud services v local database | 1 |
| **Total** | **3** |
| **Possible Answer**  The medical reports supplied by members are sensitive and should be treated and stored in a secure manner. Cloud services can provide a secure method but the facility would have been dependent on the security system of another party or organization. By storing it locally, Centro City Waves is responsible for securing the data themselves and may have felt this was a better option as it offered more control. |  |
|  |  |