Government of **Western Australia**
School Curriculum and Standards Authority

COMPUTER SCIENCE

ATAR course examination 2018

Marking Key

Marking keys are an explicit statement about what the examining panel expect of candidates when they respond to particular examination items. They help ensure a consistent interpretation of the criteria that guide the awarding of marks.

2018/62854

Section One: Short answer **40% (94 marks)**

Question 1 **(6 marks)**

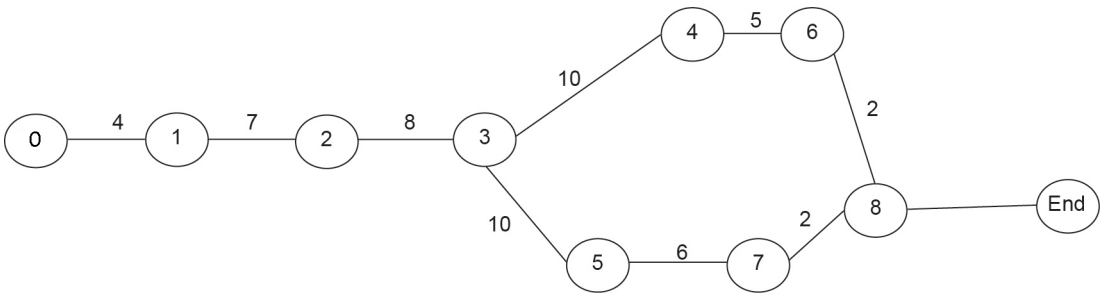
(a) State the purpose of a Gantt chart. (1 mark)

Description	Marks
to manage and keep track of a project	1
Total	**1**
Accept other relevant answers.	

(b) Draw a program evaluation review technique (PERT) chart in the space below the table to represent the information shown. (5 marks)

Description	Marks
Draws a PERT chart that features:	
sequence 1, 2 and 3 drawn correctly	1
branch 4 and 5 leaving from 3 drawn correctly	1
sequence 3, 4, 6 and 8 drawn correctly	1
sequence 5, 7 and 8 drawn correctly	1
correct duration details	1
Total	**5**

See sample answer below:



Question 2 **(6 marks)**

Describe the **two** stages of the systems development life cycle (SDLC) listed below and provide an example of an activity undertaken in each stage.

Description	Marks
For each of the **two** stages:	
Describes what occurs in the stage of the SDLC.	2
Identifies an aspect of what occurs in the stage of the SDLC.	1
Subtotal	**4**
For each of the **two** stages:	
Provides an example of an activity for the stage of the SDLC.	1
Subtotal	**2**
Total	**6**
Answers could include: • Design – the actual design of the new system begins both logically and physically Activity – creation of CD and DFD of new system etc. • Development – the developers create the new system and ensure that it is tested progressively. Hardware and software is acquired accordingly. Activity – construction, testing, acquisition etc.	
Accept other relevant answers.	

Question 3 **(4 marks)**

Describe **one** advantage and **one** disadvantage for a company using a standard operating environment (SOE).

Description	Marks
Advantage	
Describes one advantage for a company of using a SOE.	2
Identifies one advantage for a company of using a SOE.	1
Subtotal	**2**
Disadvantage	
Describes one disadvantage for a company of using a SOE.	2
Identifies one disadvantage for a company of using a SOE.	1
Subtotal	**2**
Total	**4**
Answers could include: Advantage – reduction in cost and time to deploy updates as all systems are the same. Easier to upgrade and maintain software and hardware. Disadvantage – users may not like the system or software they have to use. An administrator is normally hired and specialist software is not always available.	
Accept other relevant answers.	

Question 4 **(6 marks)**

(a) Explain how an operating system manages concurrency. (3 marks)

Description	Marks
Explains how an operating system manages concurrency.	3
Identifies an aspect of how an operating system manages concurrency.	2
Makes general or superficial comment/s about managing concurrency.	1
Total	**3**
Answers could include: An operating system manages concurrency by allowing multiple processors to execute instructions simultaneously for better performance. Tasks are broken down into subtasks that are then assigned to separate processors to perform simultaneously, instead of sequentially. In a single processor the instructions are executed sequentially and appear as if they are running concurrently.	
Accept other relevant answers.	

(b) An operating system acts as an interface between the hardware and the applications. It has four main roles, including managing concurrency. List **three** other roles of an operating system. (3 marks)

Description	Marks
scheduling	1
managing devices	1
managing memory	1
Total	**3**
Accept other relevant answers.	

Question 5 **(1 mark)**

Outline the role of a file system.

Description	Marks
to organise files in a logical manner to enable storage and retrieval/to manage how information is stored and retrieved	1
Total	**1**

Question 6 **(2 marks)**

State the function of the following:

Description	Marks
Address bus: to carry the address of the piece of memory or I/O device to be read from or written to.	1
Control bus: used by CPUs for communicating with other devices within the computer.	1
Total	**2**
Accept other relevant answers.	

Question 7 **(4 marks)**

Describe the **two** types of processing listed below.

Description	Marks
For each of the **two** types of processing:	
Describes the type of processing.	2
Identifies an aspect of the type of processing.	1
Total	**4**
Answers could include: Distributed processing – is similar to parallel with the difference that each processor resides in separate locations Multi-core processing – more than one core located in the same machine. Allows for instructions to be divided over the cores to execute.	
Accept other relevant answers.	

Question 8 **(7 marks)**

(a) State the purpose of a disaster recovery plan. (1 mark)

Description	Marks
to document a process or set of procedures to recover and protect a business IT infrastructure in the event of a disaster	1
Total	**1**
Accept other relevant answers.	

(b) Describe **three** types of disaster recovery tools. (6 marks)

Description	Marks
For each of the **three** types of disaster recovery tools:	
Describes the disaster recovery tool.	2
Identifies the disaster recovery tool.	1
Total	**6**
Answers could include: • online storage – refers to the practice of storing electronic data with a third party service accessed via the Internet • full backup – the process of backing up all of the files on a computer • uninterruptible power supply (UPS) – is an electrical apparatus that provides emergency power to a load when the input power source or mains power fails to ensure that the server can shut down correctly • incremental backup – type of backup that only copies files that have changed since the previous backup • RAID (Level 1, 10) – it is used to provide protection against disk failure in real time that provides immediate data protection and helps you continue your work by providing a mirrored copy of the data.	
Accept other relevant answers.	

Question 9 **(4 marks)**

Justify why you would use each of the database systems listed below.

Description	Marks
For each of the **two** database systems:	
Justifies why they would use the database system.	2
Makes general or superficial comment/s about why they would use the database system.	1
Total	**4**
Answers could include: Distributed – is the best for security reasons, if one system goes down the others are still operational Centralised – is the best for reliability reasons, as there is only one point and this can be protected through firewalls.	
Accept other relevant answers.	

Question 10 **(5 marks)**

(a) Describe the role of data mining. (2 marks)

Description	Marks
Describes the role of data mining.	2
Identifies an aspect of the role of data mining.	1
Total	**2**
Answers could include: Able to access search and purchase patterns which will help an organisation to target their market needs more accurately.	

(b) Explain **one** ethical implication of data mining. (3 marks)

Description	Marks
Explains an ethical implication of data mining	3
Identifies an aspect of an ethical implication of data mining.	2
Makes general or superficial comment/s about an ethical implication of data mining.	1
Total	**3**
Answers could include: • privacy – the use of medical and pharmaceutical records for data mining to gather data about their lifestyle and health can be perceived by many to be an invasion of an individual's privacy • stereotyping – patterns discovered in data mining of shopping behaviour are used to build profiles of characteristics or behaviour. Analysis of the data may show certain buying patterns of groups which may lead to stereotyping.	
Accepts other relevant answers.	

Question 11 **(5 marks)**

(a) Explain why an organisation should have a code of conduct that outlines the use of ICT by its staff. (3 marks)

Description	Marks
Explains why an organisation should have a code of conduct outlining the use of ICT by its staff.	3
Identifies an aspect of why an organisation should have a code of conduct outlining the use of ICT by its staff.	2
Makes general or superficial comment/s about an organisation having a code of conduct and the use of ICT by its staff.	1
Total	**3**
Answers could include: To ensure that all staff are aware of the rules outlined by the organisation which ensures that ICT is used in conjunction with the law and keeps staff and organisational data safe.	
Accept other relevant answers.	

(b) Outline **two** ways in which an organisation could dispose of customer data securely. (2 marks)

Description	Marks
Outlines **two** ways in which an organisation could dispose of customer data securely.	1–2
Total	**2**
Answers could include: • reformat of drive • secure delete with certain software • degaussing • destroy hardware/software.	
Accept other relevant answers.	

Question 12 **(4 marks)**

In relation to a database, explain the **two** terms listed below.

Description	Marks
Data anomaly – update	
Explains data anomaly – update.	2
Identifies an aspect of data anomaly – update.	1
Subtotal	**2**
Answers could include: A data anomaly update exists when one or more instances of duplicated data is updated, but not all. Occurs when there is repetition of data and some are updated and others not.	
Referential integrity	
Describes referential integrity.	2
Identifies an aspect of referential integrity.	1
Subtotal	**2**
Total	**4**
Answers could include: Referential integrity is a relational database concept, which states that table relationships must always be consistent. In other words, any foreign key field must agree with the primary key that is referenced by the foreign key.	
Accept other relevant answers.	

Question 13 **(4 marks)**

The entity relationship (ER) diagram below has structural errors and is **not** normalised.
Explain why this database is not in 3rd normal form (NF).

Description	Marks
Explains why the database is not in 3rd NF.	4
Identifies relevant aspects of why the database is not in 3rd NF.	3
Identifies relevant aspects of the errors.	2
Makes general or superficial comment/s about the error/s.	1
Total	**4**

Answers could include:
There are too many to many relationships shown in this ERD e.g. many customers have many orders and many parts to many orders. This needs to be resolved by having associative entities between the many to many. This will change the cardinality to 1:M: and N:1
The quantity attribute does not belong to either order or part as it needs to be in an associative entity.

1. To be in 3NF it must be in 1NF – there are no primary keys for PART and ORDER so it is not in 1NF so not in 3NF.
2. An attribute cannot be associated with a relationship. It must be in a table and fully/functionally dependent on the primary key of that table (quantity).
3. There is a many to many relationship so it is not in 2NF so therefore not in 3NF.
4. Name in CUSTOMER not likely to be atomic so therefore not in 1NF so cannot be in 3NF.

Accept other relevant answers.

Question 14 **(4 marks)**

Aside from user needs, describe **two** other factors that affect the development of software.

Description	Marks
For each of the **two** factors:	
Describes how the factor affects the development of software.	2
Identifies an aspect of how the factor affects the development of software.	1
Total	**4**

Answers could include:

- user interface is an important aspect for the development of software which focuses on anticipating what users might need to do and ensuring that the interface has elements that are easy to access, understand, and use to facilitate those actions. This may affect the size and position of buttons, forms, fonts and many other aspects of the interface structure
- processing efficiency affects the development of software in regards to the time that may be spent on fixing issues once these have been identified or troubleshooting issues when they come up
- development time can range from a few hours to many months depending on the product. Sometimes unexpected complications can come up which will need extra time to ensure the software does not run the risk of not functioning properly.

Accept other relevant answers.

Question 15 **(11 marks)**

(a) Outline the purpose of the code on line 3. (1 mark)

Description	Marks
Outlines the purpose of the code on line 3.	1
Total	**1**
Answers could include: • this code ensures that TOTAL_PRICE is set to 0 just in case there is a legacy data left in the variable • ensures that it is set to 0 before the loop begins • initialise this variable.	

(b) Describe a limitation of the iteration control structure used in the code. (2 marks)

Description	Marks
Describes a limitation of the iteration control structure used in the code.	2
Identifies a limitation of the iteration control structure used in the code.	1
Total	**2**
Answer could include: • REPEAT UNTIL loop is executed until condition becomes true, the condition is tested after each repetition of the loop. It is executed at least once no matter what the condition variable is because the check of the variable is located at the end of the statement block.	
Accept other relevant answers.	

(c) Rewrite the entire pseudocode using a test first iteration control structure. (8 marks)

Description	Marks
Rewrites the pseudocode using a test first iteration control structure:	
Initialises variables (COUNT and TOTAL_PRICE).	1
Reads value external to loop.	1
Subtotal	**2**
Uses a test first iteration control structure (While-Do)	
Uses reserved words and condition correctly.	1
Applies counter within loop correctly.	1
Calculates total price within loop correctly.	1
Enables input variable within the loop correctly.	1
Determines output of final value external to the loop.	1
Uses open and close of module (BEGIN and END).	1
Subtotal	**6**
Total	**8**
Note to markers: This is one example of a pseudocode. Accept other relevant pseudocodes.	

```
Begin
    Count←0
    Total_Price←0
    Input (Price)
    While Price <> 0.00 Do
        Count← Count+1
        Output (Count,Price)
        Total_Price←  Price + Total_Price
        Input (Price)
    Output(TotalPrice)
End
```

Question 16 **(4 marks)**

In relation to creating a program, describe the **two** concepts listed below.

Description	Marks
For each of the **two** concepts:	
Describes the concept in relation to creating a program.	2
Identifies aspect of the concept in relation to creating program.	1
Total	**4**
Answers could include: Function – a type of procedure that returns a value. Allows us to reuse code and is called upon within the program Modularisation – is the process of breaking code into small components that tend to run a particular task. Again allows us to reuse code.	
Accept other relevant answers.	

Question 17 **(3 marks)**

Explain how range checking is used to test an algorithm.

Description	Marks
Explains how range checking is used to test an algorithm.	3
Identifies an aspect of how range checking is used to test an algorithm.	2
Makes general or superficial comment/s about using range checking to test an algorithm.	1
Total	**3**
Answers could include: Range checking is used to test the boundaries of the data, e.g. if the statement states age >16 and age <30 a range check would test numbers below 16, above 30 and in between.	
Accept other relevant answers.	

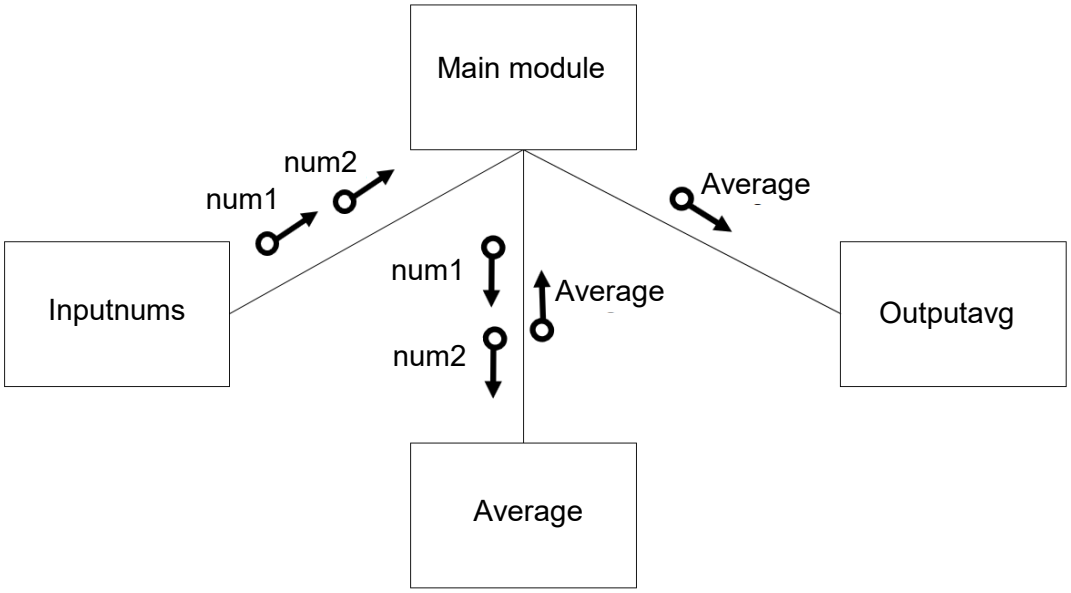
Question 18 **(2 marks)**

Describe **one** difference between a syntax error and a run-time error.

Description	Marks
Describes one difference between a syntax error and a run-time error.	2
Identifies one difference between a syntax error and a run-time error.	1
Total	**2**
Answers could include: A syntax error is an error in the syntax of the language or an equation within the program whereas a runtime error occurs during the execution of the program with an unexpected error typically in memory.	
Accept other relevant answers.	

Question 19 **(8 marks)**

In the space below, draw a structure chart that represents the algorithm above.



Description	Marks
Draws a structure chart that:	
Identifies the three modules and the function.	1–4
Subtotal	**4**
Identifies the parameter passing to the main module	
num1, num2	1
average/Average or return	1
Subtotal	**2**
Identifies the parameter passing from the main module	
num1, num2	1
average/Average or return	1
Subtotal	**2**
Total	**8**
Accept other relevant answers.	

Question 20 **(2 marks)**

Outline **one** advantage and **one** disadvantage of using fibre optic transmission media instead of shielded twisted pair (STP).

Description	Marks
Outlines one advantage of using fibre optic transmission media as opposed to shielded twisted pair (STP).	1
Outlines one disadvantage of using fibre optic transmission media as opposed to shielded twisted pair (STP).	1
Total	**2**
Answers could include: Advantage – fast and suffers from less interference. Can be used for long distances without the use of repeaters. Disadvantage – it can be expensive and difficult to join.	
Accept other relevant answers.	

Question 21 **(2 marks)**

Describe the difference between a storage area network (SAN) and a network attached storage (NAS).

Description	Marks
Describes the difference between a SAN and a NAS.	2
Identifies a difference between a SAN and a NAS.	1
Total	**2**
Answers could include: A NAS is a single storage device that operates on data files whereas a SAN is a local network of multiple devices.	

Section Two: Extended answer **60% (110 Marks)**

Question 22 **(38 marks)**

(a) Identify the system development methodology that C.C. Supermarket Corporation should use in the development of their online shopping portal and outline why. (3 marks)

Description	Marks
Identifies the system development methodology that C.C. Supermarket Corporation should use.	1
Subtotal	**1**
Outline	
Outlines why the system development methodology should be used.	2
Identifies aspect of the system development methodology.	1
Subtotal	**2**
Total	**3**
Answers could include: Linear/SDLC – as it is a big investment it would make sense for C.C. Supermarket Corporation to go through a detailed process. A large team has also been created to ensure that the work is done thoroughly. This would ensure that they did not release something too quickly and it was tested thoroughly.	
Accept other relevant answers that support Linear/SDLC methodologies.	

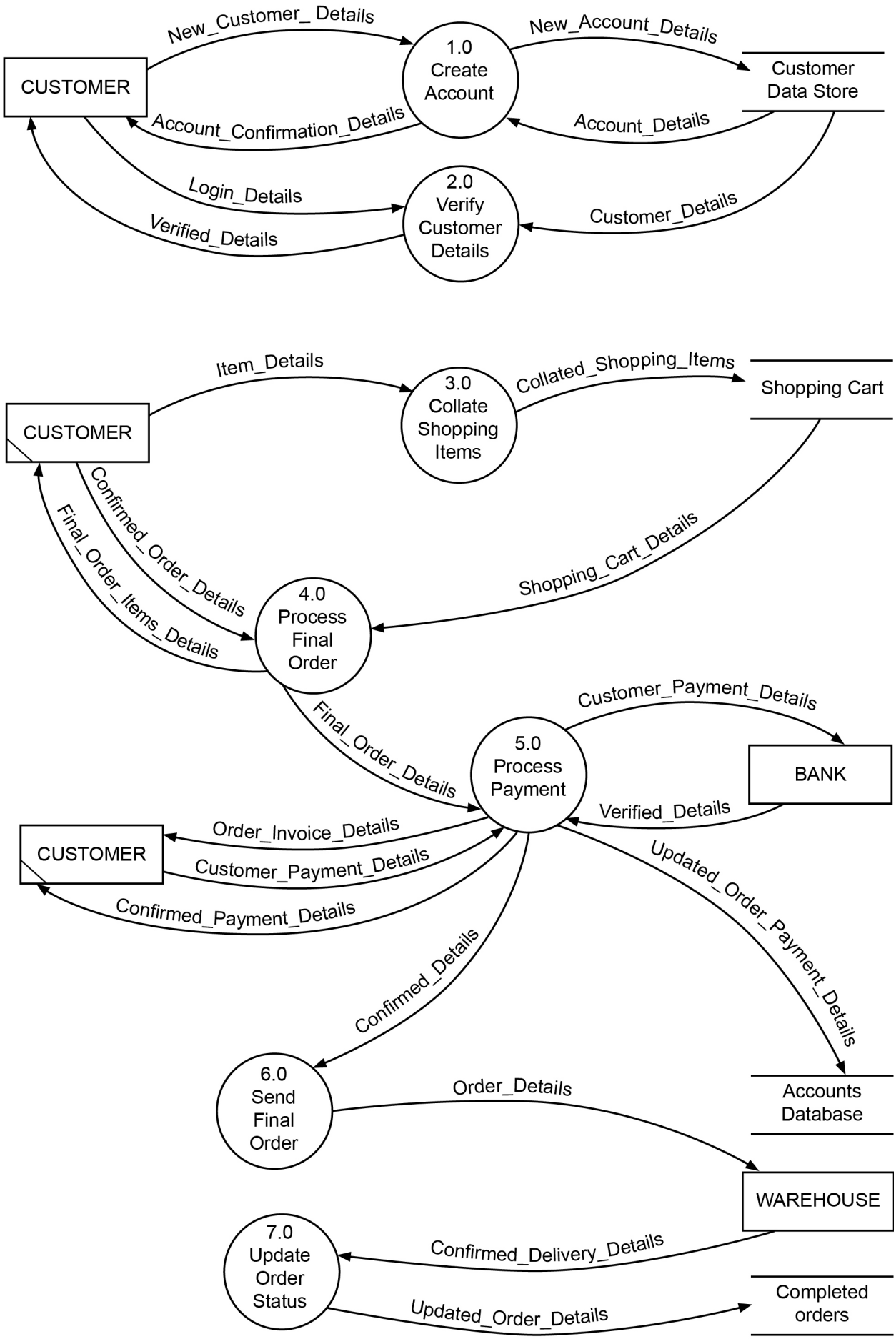
(b) Describe **two** computer-aided software engineering (CASE) tools that could be used by the system analyst for this project. (4 marks)

Description	Marks
For each of the **two** CASE tools:	
Describes the CASE tool that could be used by the system analyst.	2
Identifies aspect of the CASE tool that could be used by the system analyst.	1
Total	**4**
Answers could include: • Gantt chart – for planning and scheduling of the project tasks. For example a Gantt chart can be used to assess how long the project should take, determine the resources needed, and plan the order in which tasks can be completed. • PERT chart – which can be used to schedule, organise, and coordinate tasks within a project. It will help the system analyst and his/her team of programmers, database developers and document writers to visualise the order of tasks, milestones and phases within a project allowing the effective coordination of work across the project team.	
Accept other relevant answers.	

Question 22 (continued)

(c) Draw the Level 0 Data Flow Diagram (DFD) for the C.C. Supermarket Corporation online shopping portal system. (28 marks)

Description	Marks
Draws a Level 0 DFD that features:	
Entities	
• CUSTOMER • BANK • WAREHOUSE	1–3
Subtotal	**3**
Data Stores (named appropriately)	
• Customer Data Store • Shopping Cart • Accounts Database • Completed Orders	1–4
Subtotal	**4**
Processes (must include number and verb)	
• 1.0 Create Account • 2.0 Verify Customer Details • 3.0 Collate Shopping Items • 4.0 Process Final Order • 5.0 Process Payment • 6.0 Send Final Order • 7.0 Update Order Details	1–7
Subtotal	**7**
Appropriate data flows (drawn in correct direction and labelled appropriately)	
1.0 Create account	
◦ Appropriate data flow/s in: new customer details and account details	1
◦ Appropriate data flow/s out: account confirmation and new account details	1
2.0 Verify customer details	
◦ Appropriate data flow/s in: login details and customer details	1
◦ Appropriate data flow/s out: verified details	1
3.0 Collects shopping items	
◦ Appropriate data flow/s in: items details	1
◦ Appropriate data flow/s out: collated order details	1
4.0 Process final order	
◦ Appropriate data flow/s in: shopping cart details confirmed order details	1
◦ Appropriate data flow/s out: final order items details	1
5.0 Process payment	
◦ Appropriate data flow/s in: final order details, customer payment details and verified details	1
◦ Appropriate data flow/s out: customer payment details, confirmed payment details and updated order payment details, order invoice details	1
6.0 Send Final Order	
◦ Appropriate data flow/s in: confirmed order details	1
◦ Appropriate data flow/s out: order details	1
7.0 Update Order Details	
◦ Appropriate data flow/s in: confirmed delivery details	1
◦ Appropriate data flow/s out: updated order details	1
Subtotal	**14**
Total	**28**
Note to markers: The Data Flow Diagram provided is just one example of a DFD that can be drawn for the C.C. Shopping Corporation system. Accept other relevant DFDs.	


CUSTOMER
New_Customer_ Details
1.0
Create
Account
New_Account_Details
Customer
Data Store
Account_Confirmation_Details
Account_Details
Login_Details
2.0
Verify
Customer
Details
Customer_Details
Verified_Details
CUSTOMER
Item_Details
3.0
Collate
Shopping
Items
Collated_Shopping_Items
Shopping Cart
Confirmed_Order_Details
Final_Order_Items_Details
Shopping_Cart_Details
4.0
Process
Final
Order
Final_Order_Details
Customer_Payment_Details
5.0
Process
Payment
BANK
Verified_Details
CUSTOMER
Order_Invoice_Details
Customer_Payment_Details
Confirmed_Payment_Details
Confirmed_Details
Updated_Order_Payment_Details
6.0
Send
Final
Order
Order_Details
Accounts
Database
WAREHOUSE
7.0
Update
Order
Status
Confirmed_Delivery_Details
Updated_Order_Details
Completed
orders

Question 22 (continued)

(d) The C.C. Supermarket Corporation online shopping portal has now been operating for three months and there have been some complaints from customers. Explain how you would use **one** data gathering technique to help identify the issues that customers are experiencing. (3 marks)

Description	Marks
Explains how they will use one data gathering technique to help identify the issues that customers are experiencing.	3
Identifies aspect of how one data gathering technique can be used to help identify the issues that customers are experiencing.	2
Identifies a relevant data gathering technique that will help identify the issues that customers are experiencing.	1
Total	**3**
Answers could include: • a questionnaire which customers can fill out online and the results can help identify ways in which the business can improve the customer experience. An effective questionnaire will help the business understand their customers' likes, dislikes and where improvements need to be made. Responding to the customers who complete the questionnaire would also increase customer user experience and loyalty • interviewing customers who have experienced issues will provide a better understanding of the issues. Good communication skills during the interview process ensures that customers can elaborate on issues.	
Accept other relevant answers.	

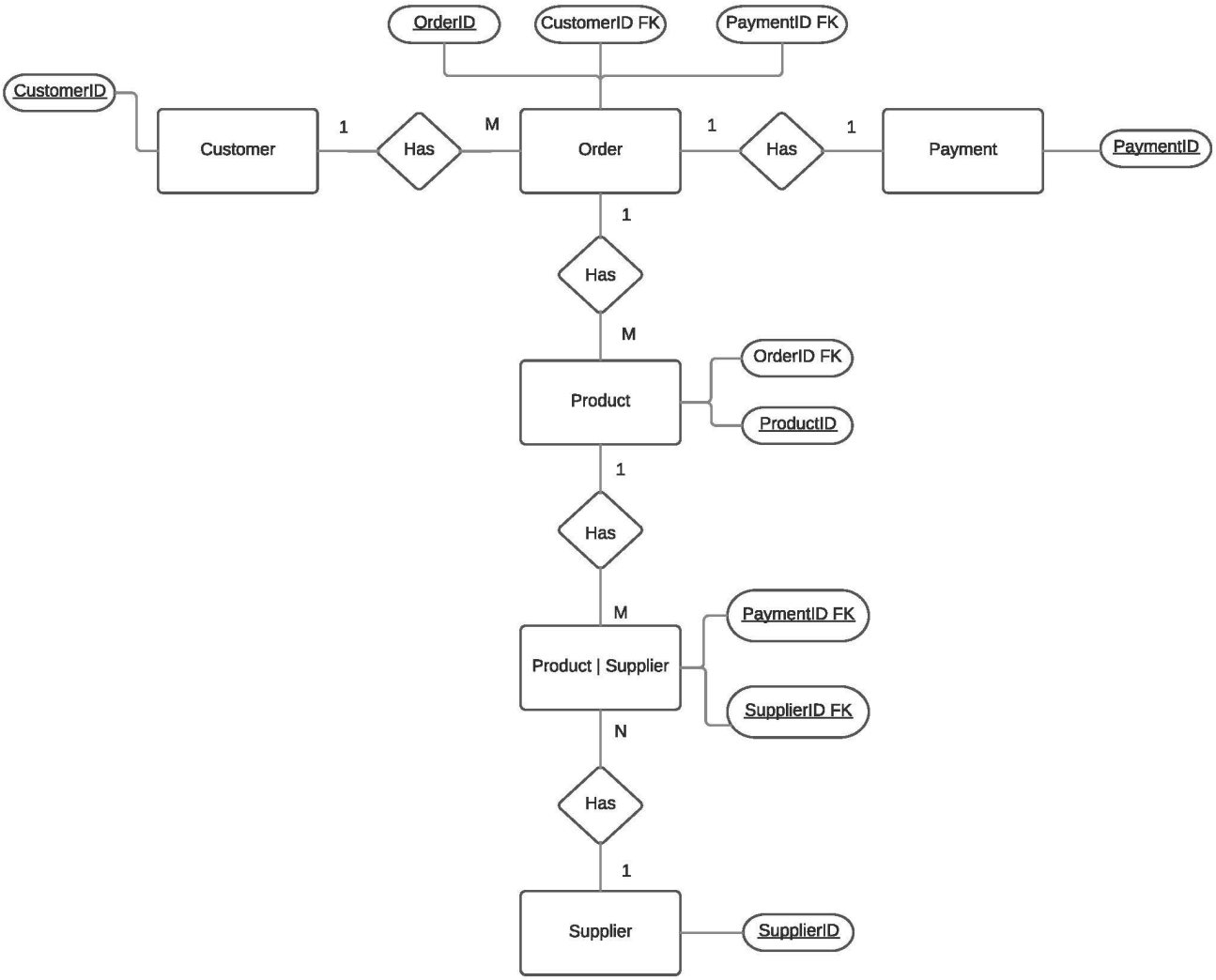
Question 23 **(23 marks)**

(a) Using Chen's notation, draw an ER diagram that includes the following:
- the names of all primary keys
- the names of all foreign keys
- the relationships
- the cardinality.

You need to ensure that your ER diagram is in the 3rd normal form. (13 marks)

Description	Marks
Draws a relevant ER diagram for the given context that includes:	
Chen notation	
Uses Chen notation appropriately.	1
Subtotal	**1**
Entities, relationships and cardinalities. Note: markers need to consider the candidate's interpretation of the given context and the ER diagram they have drawn.	
Identifies all entities, relationships and cardinalities correctly.	6
Identifies five entities, relationships and cardinalities correctly.	5
Identifies four entities and some relationships and cardinalities correctly.	4
Identifies most entities and some relationships and/or cardinalities correctly.	3
Identifies some entities and some relationships and/or cardinalities correctly.	2
Identifies some entities correctly.	1
Subtotal	**6**
Primary keys (appropriate to entities). Note: markers need to consider the candidate's interpretation of the given context and the ER diagram they have drawn. Allow for the potential inclusion of composite key(s) for an associative entity.	
Identifies all primary keys correctly.	3
Identifies most primary keys correctly.	2
Identifies some primary keys correctly.	1
Subtotal	**3**

Description	Marks
Foreign keys (appropriate to entities). Note: markers need to consider the candidate's interpretation of the given context and the ER diagram they have drawn.	
Identifies all foreign keys correctly.	3
Identifies most foreign keys correctly.	2
Identifies some foreign keys correctly.	1
Subtotal	**3**
Total	**13**
Note to markers: The ER diagram below is just one example of an ER diagram that can be drawn. Accept other relevant ER diagrams.	



Question 23 (continued)

(b) Refer to your ER diagram in part (a) and write a query, using Structured Query Language (SQL), that will display customers' orders from 1/11/2018 to 30/11/2018 with the following information:

- OrderDate
- OrderID
- CustomerID
- ProductID. (4 marks)

Description	Marks
Refers to their ER diagram and writes a query that features:	
correct syntax i.e. SELECT Field name…FROM Table name…	1
condition is stated appropriately	1
fields based on part (a) that are named appropriately	1
entities based on part (a) that are named appropriately	1
Total	**4**
Note to markers: The query below is just one example of a query that can be written for the ER diagram. Also accept dot notation.	
SELECT OrderDate, OrderID, CustomerID, ProductID FROM Order, Product WHERE From OrderDate >= 1/11/2018 AND To OrderDate <=30/11/2018	

(c) Explain how you could apply **two** validation rules in your database structure. (6 marks)

Description	Marks
For each of the **two** validation rules:	
Explains how the validation rule can be applied in the database structure.	3
Identifies aspect of how the validation rule can be applied in the database structure.	2
Makes general or superficial comment/s about how the validation rule can be applied in the database structure.	1
Total	**6**
Answers could include: • use no zero or null values for customer ID to ensure there has to be a customer ID input • set the requirement for the credit card expiration date entries to be later than the current date which would ensure the credit card is firstly valid before accepting it • use correct format to ensure that users provide information in the correct format. This would apply to customers inputting their email address, date of birth, phone numbers for example. If information is not in the correct format, users should be informed and correct format should be suggested.	
Accept other relevant answers.	

Question 24 **(26 marks)**

(a) Write the Module CalculateTotalCost that will calculate the total cost of 10 items purchased. The total cost will then be passed to Module OutputFinalTotal. (8 marks)

Description	Marks
Writes a module in pseudocode that features:	
parameter list that contains 1 value	1
the initialising of a variable that stores the total	1
correct syntax of iteration structure	1
correct input of 10 values	1
correct application to calculate the sum of 10 values	1
correct Input variable for total cost	1
correct computation of TotalCost ← TotalCost + Item_cost	1
open and closure of module	1
Total	**8**
Note to markers: The module in pseudocode below is just one example of a module that can be written. Accept other relevant modules.	

```
Module CalculateTotalCost(totalcost)
Begin
    Items ← 1
    TotalCost ← 0
    WHILE Items < = 10 DO
    Input (cost)
        TotalCost = TotalCost +(cost)
        Items = Items + 1
    ENDWHILE
End module
```

Question 24 (continued)

(b) Module DeliveryCost will calculate the cost of delivery based on the postcode of the customer. The total cost of delivery is then passed to the Module OutputFinalTotal.

The delivery costs to postcodes are listed below. Postcodes between:
- 6000 and 6049 will be charged $25.00 per order
- 6050 and 6550 will be charged $50.00 per order
- 6550 and 6999 will be charged $65.00 per order.

A message stating 'This order cannot be shipped' will be displayed for deliveries to addresses with postcodes less than 6000 or greater than 6999.

Write the Module DeliveryCost to calculate the cost of delivery below, using a case statement. (8 marks)

Description	Marks
Writes a module in pseudocode that features:	
parameter list that contains 1 value	1
Syntax of selection structure for outside scope	
(postcode >6000) and (postcode<6999)	1
output ('This order cannot be shipped')	1
appropriate syntax of selection structure (case statement)	1
Computation of delivery cost using a case statement	
=<6049: deliverycost ← 25.00	1
=<6550: deliverycost ← 50.00	1
<=6999: deliverycost ← 65.00	1
open and closure of module	1
Total	**8**

Note to markers: The module in pseudocode below is just one example of a module that can be written. Accept other relevant modules.

```
Module DeliveryCost(deliverycost)
Begin
        Input(postcode)
        If (postcode >6000) and (postcode<6999)
        Then
                Begin
                Case postcode of
                    =<6049: deliverycost ← 25.00
                    =<6550: deliverycost ← 50.00
                    <=6999: deliverycost ← 65.00
                End Case
        Else output ('This order cannot be shipped')
End Module
```

Note: Dot point three should have read:

- 6551 and 6999 will be charged $65.00 per order

Marking was adjusted for this error.

(c) Module OutputFinalTotal will calculate the total cost of the order.

The calculation requires a 10% administrative charge to be added to the total from the Module CalculateTotalCost in part (a). This will then be added to the delivery cost calculated from Module DeliveryCost in part (b).

Write the Module OutputFinalTotal below. (6 marks)

Description	Marks
Writes a module in pseudocode that features:	
parameter list that contains 2 values	1–2
Computation of total cost to the customer	
correct calculation of administrative charge (10%)	1
correct addition of administrative charge to total and delivery cost	1
correct output of final cost	1
open and closure of module	1
Total	**6**
Note to markers: The module in pseudocode below is just one example of a module that can be written. Accept other relevant modules.	
Module OutputFinalTotal (totalcost, deliverycost) Begin Finalcost←(total x 0.10) + total + deliverycost Output(Finalcost) End module	

(d) To ensure the Module DeliveryCost you developed in part (b) is operating correctly, test the boundaries of the module by providing sample postcodes, and the resulting output for each, in the table below. The first line has been done for you. (4 marks)

Description	Marks
Provides the test data and resulting outcome for the **four** boundaries of the given module.	1–4
Total	**4**

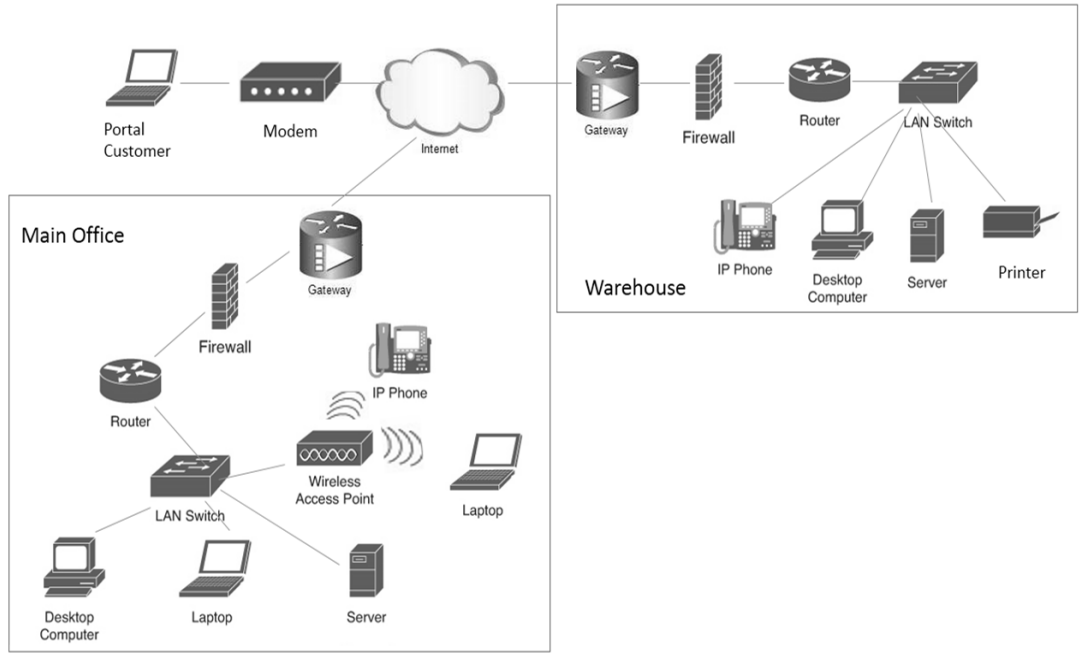
A sample answer is shown below.

Test data	Output
6040	25.00
6550	50.00
6700	65.00
7001	This order cannot be shipped.

Question 25 **(23 marks)**

(a) Using Cisco conventions, draw a network diagram in the warehouse box provided on page 27 that shows the connections within the warehouse and the connection of the warehouse to the ISP. (10 marks)

Description	Marks
Draws a network diagram that features:	
Sequencing of network components from ISP to switch in the correct order	
• firewall • router • switch	1–3
Subtotal	**3**
Provision of other network components in warehouse	
• printer • gateway • IP phone • desktop computer • database server • webserver • WAP • connection of the gateway to the internet	1–6
Subtotal	**6**
CISCO conventions uses appropriately for components	1
Subtotal	**1**
Total	**10**
Note to markers: the network diagram provided below is just one example of how it can be drawn, accept other relevant configurations. For example, the firewall and router could be drawn as a single device.	



(b) The server of the C.C. Supermarket Corporation's warehouse receives a file with recent customer orders from the main server of the Corporation. It has been identified that a number of orders have been corrupted. Explain how a checksum error detection method can be used to identify and correct errors in transmitted data. (3 marks)

Description	Marks
Explains how the checksum error detection method can be used to identify and correct errors in transmitted data.	3
Identifies aspect of how a checksum error detection method can be used to identify and correct errors in transmitted data	2
Makes general or superficial comment/s about a checksum error detection method and identifying and correcting errors in transmitted data.	1
Total	**3**
Answers could include: A checksum is created by a calculation on the values in a packet or other block of data using some algorithm and storing the results with the data. When the data is retrieved from memory or received at the other end of a network, a new checksum is calculated and compared with the existing checksum.	
Accept other relevant answers.	

(c) Describe how each of the devices listed below enables the C.C. Supermarket Corporation to operate its online shopping portal. (10 marks)

Description	Marks
For each of the **five** devices:	
Describes the role of the devices in network communications referring to C.C. Supermarket..	2
Identifies an aspect of the role of the device in network communications.	1
Total	**10**
Answers could include: • router – a router is connected to two or more data lines from different networks. It forwards data packets between networks which allows the networks to connect • switch – a high-speed device that receives incoming data packets and redirects them to their destination and creates the LAN for the warehouse and main office • NIC – a usually built-in card that provides the hardware interface between a computer and the network. Can be either wired or wireless to allow connection to the LAN in the warehouse and main office • modem – is a device that connects a computer/network to the internet. Changes analogue to digital signals and vice versa allowing customers to connect to the shopping portal • wireless access point – a WAP allows a WiFi device to connect to a wired network for mobile users in C.C. Supermarket to access resources wirelessly.	
Accept other relevant answers.	

ACKNOWLEDGEMENTS

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Question 5 Text under 'Description' information from: Rouse, M. (2018). *File system.* Retrieved August, 2018, from https://searchstorage.techtarget.com/definition/file-system

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Question 12

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Question 25(a)

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