Examiners' Report

Principal Examiner Feedback

Summer 2024

Pearson Edexcel International Advanced Level in Information Technology (WIT13/ 01)

Unit 3

Paper WIT13/01

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Introduction

This is the third full live series for this unit of the IAL IT. The first was in 2019, with years 2020, 2021, and 2022 being disrupted due to Covid19. The 2023 series was the first after Covid19.

Interpreting words used in the questions

The command taxonomy, available in the specification appendix 6, details the requirements for responses to both the command word **explain** and the command word **describe**. These command words are most often seen in questions worth two marks. One mark is for a statement. The second mark is for a development of that statement (describe) or a justification of that statement (explain). The statement and the expansion must be linked and make sense together.

Responses were often seen for these questions that could only be awarded a single mark, as the development or justification was missing. The mark schemes for Q03b and Q06b demonstrates patterns for responses to an explain question that achieve both marks.

In some questions, the command word **describe** is used where the response is a description of a process. These questions may be worth more than two marks. Each mark is a step in the process.

The words used in the questions should help students identify what is required in the response. There is a difference between characteristics (what something is), functionality (what it does), affordability (what it allows you to do), and its benefits or drawbacks (why you would/would not use it). Q02c asks for two benefits of using VMs, rather than what a VM is.

Subject-specific terminology

Across all the questions, there was a tendency to omit the use of subject-specific terms or to confuse some words with others. Responses often were general and high-level where the use of a subject-specific term would have more clearly demonstrated knowledge and understanding.

Subject-specific notation

There were no questions in this paper that required drawing from scratch. However, the wording of the questions set out the exact requirements for completing the diagrams.

Essays

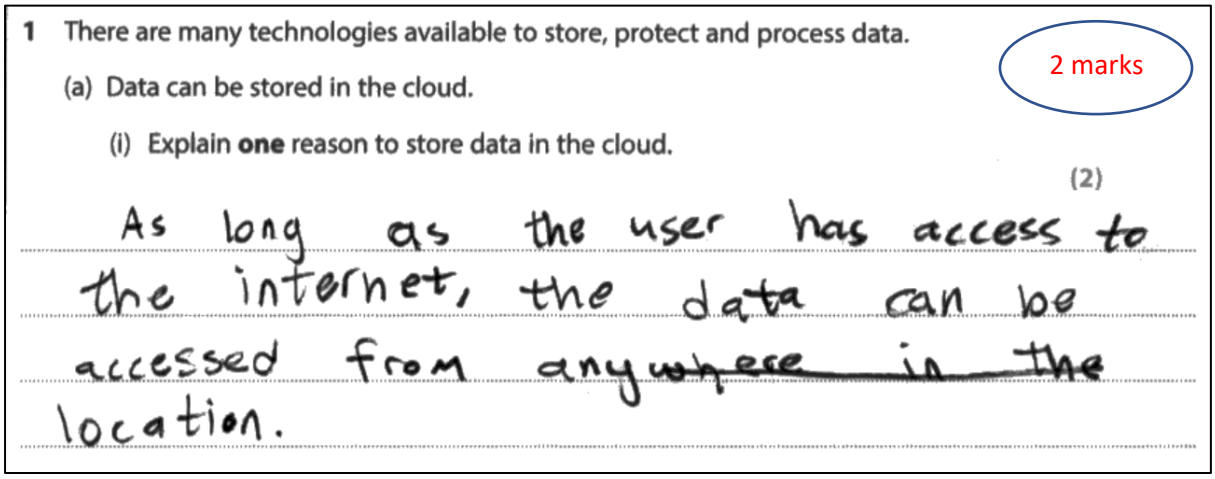
Essays are marked using levels-based mark schemes. The contents and information provided in the essays should be technically accurate. The length of the essay is not necessarily related to the awarded mark. For all essays, it is possible to achieve full marks using no more than the space provided in the question paper. Long, rambling essays that include vague or inaccurate information are awarded no more marks than shorter, accurate, and more concise essays.

Q01ai

This is the first of two questions asking about storing data in the cloud.

Accessibility through an Internet connection and use as a backup of local secondary storage were most frequently seen by examiners.

Some responses lacked clarity, giving the impression that cloud storage was limitless, required no physical storage space, and is more secure than local storage.



1 There are many technologies available to store, protect and process data.

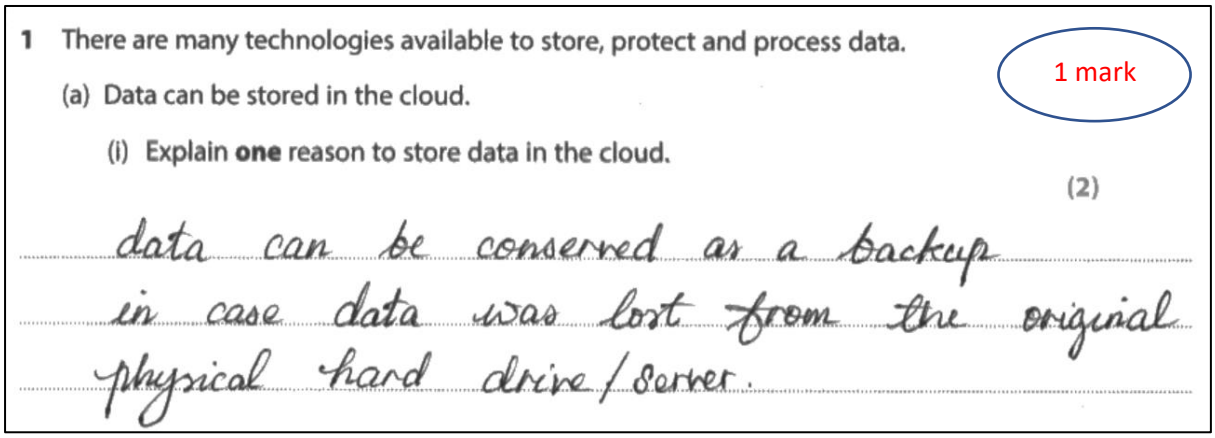
(a) Data can be stored in the cloud.

(i) Explain **one** reason to store data in the cloud.

(2)

2 marks

As long as the user has access to the internet, the data can be accessed from anywhere in the location.



1 There are many technologies available to store, protect and process data.

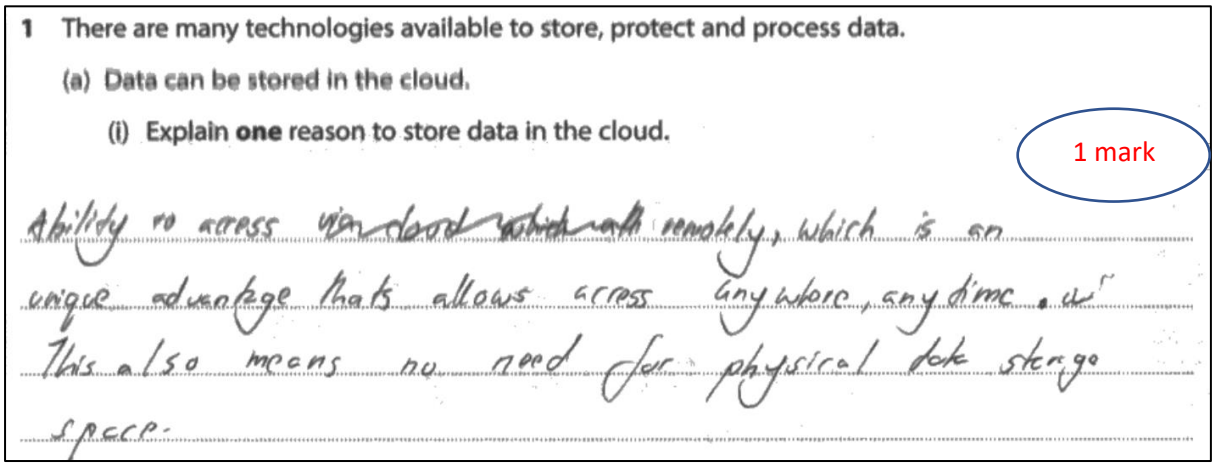
(a) Data can be stored in the cloud.

(i) Explain **one** reason to store data in the cloud.

(2)

1 mark

data can be conserved as a backup in case data was lost from the original physical hard drive / server.



1 There are many technologies available to store, protect and process data.

(a) Data can be stored in the cloud.

(i) Explain **one** reason to store data in the cloud.

1 mark

Ability to access via cloud remotely, which is an unique advantage that allows access anywhere, anytime. This also means no need for physical data storage space.

1 There are many technologies available to store, protect and process data.

0 marks

(a) Data can be stored in the cloud.

(i) Explain **one** reason to store data in the cloud.

(2)

- Storing data in an cloud is a big advantage that it uses virtual storage so no physical storage space needed.
- Cloud storage is more secure than the physical storages

Q01aii

This is the second of two questions asking about storing data in the cloud.

This question required an explanation of one way that it is secured. Firewalls and encryption are given in the question, so are not awarded as responses.

(ii) Data stored in the cloud may be protected by firewalls and encryption.

Explain **one other** way that cloud storage is secured

(2)

2 marks

by a username and password that you need to fill in before accessing the cloud storage which can be connected to E-mail.

(ii) Data stored in the cloud may be protected by firewalls and encryption.

Explain **one other** way that cloud storage is secured

(2)

1 mark

It is linked to the email, password or an ID so unless someone knows the password it will be secure.

(ii) Data stored in the cloud may be protected by firewalls and encryption.

Explain **one other** way that cloud storage is secured

(2)

1 mark

2fa which requires ~~a~~ correct login details and ~~correct code~~ the input of ~~of~~ the correct randomly generated code.

(ii) Data stored in the cloud may be protected by firewalls and encryption.

Explain **one other** way that cloud storage is secured

(2)

0 marks

Part of the Data is stored in many places this would further increase security in cloud storage.

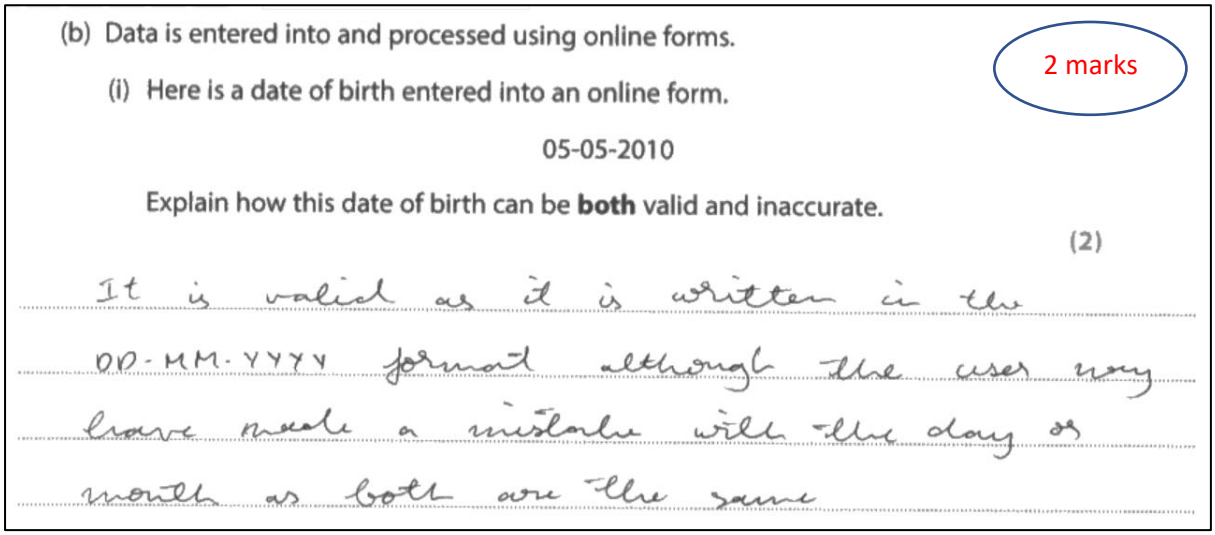
Q01bi

This is question is about the distinction between valid and inaccurate data.

The question requires responses that explain why it can be both valid and inaccurate. When data is valid, it meets the requirements to be processed, e.g. it is the correct format. When data is accurate, it is truthful.

Some responses focused on misinterpreting the format, e.g. mm-dd or dd-mm. To be valid, it does not matter how the human interprets it. The inputted data fits the format, so the code behind the form will process it. The date is valid.

On the other hand, to be accurate, the inputted date must represent the real birthdate of the person entering it. The inputted date could be false for many reasons, including the user lying, the user entering day for month, or vice versa. To be inaccurate, the human must be involved.



(b) Data is entered into and processed using online forms.

2 marks

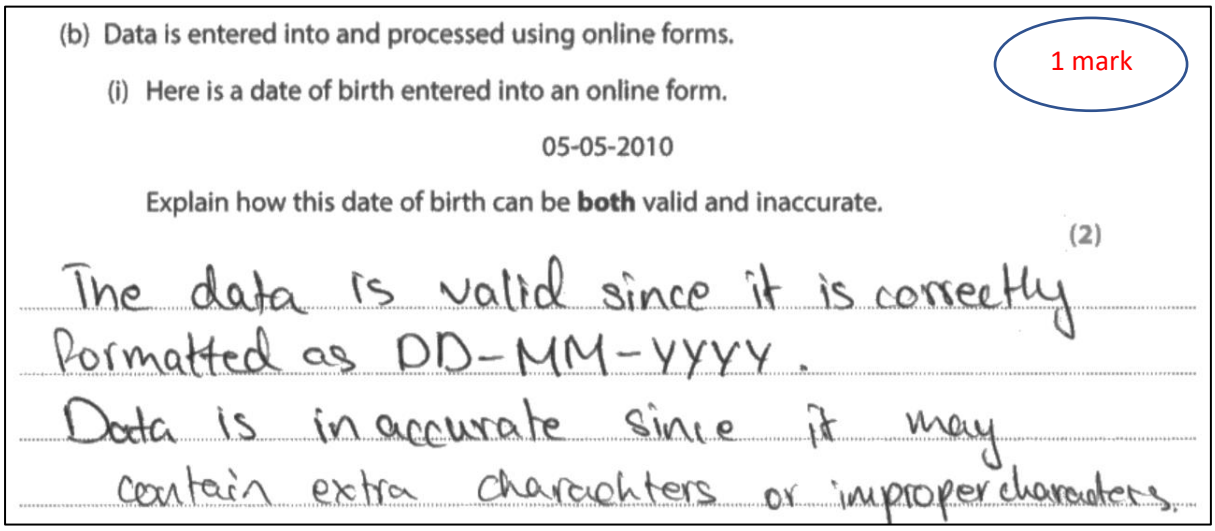
(i) Here is a date of birth entered into an online form.

05-05-2010

Explain how this date of birth can be **both** valid and inaccurate.

(2)

It is valid as it is written in the DD-MM-YYYY format although the user may have made a mistake with the day or month as both are the same



(b) Data is entered into and processed using online forms.

1 mark

(i) Here is a date of birth entered into an online form.

05-05-2010

Explain how this date of birth can be **both** valid and inaccurate.

(2)

The data is valid since it is correctly formatted as DD-MM-YYYY.

Data is inaccurate since it may contain extra characters or improper characters.

(b) Data is entered into and processed using online forms.

(i) Here is a date of birth entered into an online form.

1 mark

05-05-2010

Explain how this date of birth can be **both** valid and inaccurate.

(2)

Since the date is given in the format day/month/year the date might be valid but since '-' is used to seperate it without the use of '/', it might be inaccurate.

(b) Data is entered into and processed using online forms.

(i) Here is a date of birth entered into an online form.

0 marks

05-05-2010

Explain how this date of birth can be **both** valid and inaccurate.

(2)

this data can be inaccurate as there isn't a format given to define the order of date, month and year. while it can be valid since the values are within the range of date, month or year.

Q01bii

This question asks about the different validation methods used to ensure inputted data is fit to be processed.

Examiners saw many good responses to this question, using accurate subject-specific terminology.

Some responses attempted to describe a range check on the name field. However, a few were not clear that it was the length of the name being checked.

(ii) A student is registering at a tutoring website for AS- and A-Level subjects.

Figure 1 shows part of the web page for registration.

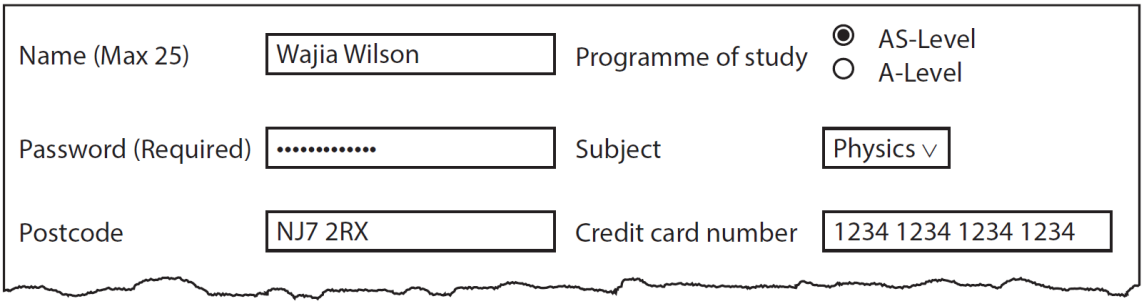


Figure 1

Complete the table to identify the type of validation required for each input item.

6 marks

Use each type of validation only once.

(6)

Input item	Validation required
Name	Length Check
Password	~~Format Check~~ Presence check
Programme of study	Lookup check
Subject	List Check
Credit card number	Check digit
Postcode	Format Check

Complete the table to identify the type of validation required for each input item.

5 marks

Use each type of validation only once.

(6)

Input item	Validation required
Name	length check
Password	Presence check
Programme of study	Range check
Subject	list check
Credit card number	check digit
Postcode	format

Complete the table to identify the type of validation required for each input item.

4 marks

Use each type of validation only once.

(6)

Input item	Validation required
Name	Range check
Password	Presence check
Programme of study	List check
Subject	~~List check~~ Lookup check
Credit card number	check digit
Postcode	Validation check / integrity

Complete the table to identify the type of validation required for each input item.

3 marks

Use each type of validation only once.

(6)

Input item	Validation required
Name	Length
Password	Presence
Programme of study	Presence
Subject	Presence
Credit card number	Length
Postcode	Format

Q02a

Examiners saw many good responses to this question, using subject-specific terminology.

However, they also saw physical and switch for the first cell. Medical was seen for the second cell. Audio, in the third cell, was rarely missed. Examiners also saw GPS, navigation, and augmented reality for the last cell.

A few responses demonstrated confusion between the type of human computer interaction and what the technicians might use the devices for. These included descriptions such as monitor heartbeats and find locations.

2 Ambulance technicians undertake many different types of training.

(a) The ambulance technicians can interact with devices in different ways.

Complete the table to give the type of human computer interaction shown in **each** image.

(4)

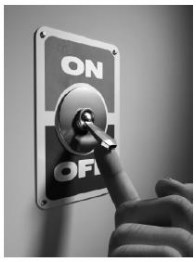
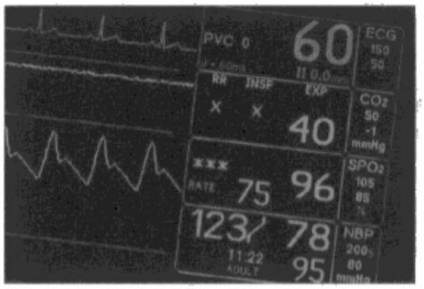
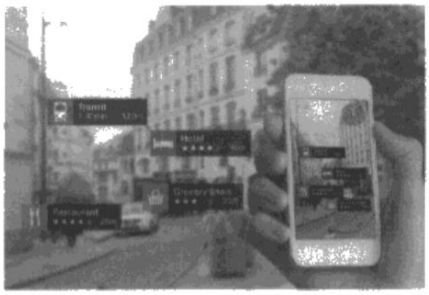
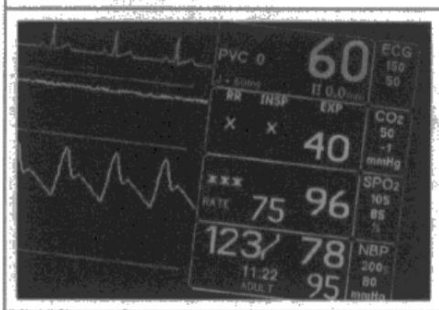
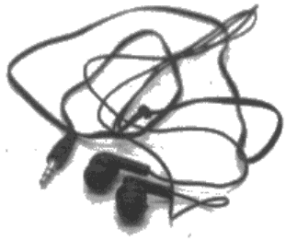
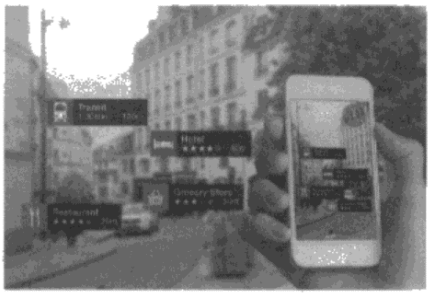
Image	Type of human computer interaction
	
	
	
	

Image	Type of human computer interaction
	haptic
	Visual
	Audio
	Interface

3 marks

Image	Type of human computer interaction
	Physical, flipping a switch. 1 mark
	~~Biological~~ medical
	Audio interaction
	Augmented reality.

Q02b

This question required a description of how augmented reality could be applied in the process of CPR. A description of the CPR process was provided in the question.

Many responses were awarded one mark for a way that augmented reality could help the technicians in the CPR training, such as showing a placement of hands. However, these responses often failed to achieve the second mark because they lacked the connection to augmented reality, such as wearing a heads-up display visor.

Responses that described benefits of using augmented reality in CPR training were awarded no marks.

(b) One type of training is for cardiopulmonary resuscitation (CPR).

CPR is a procedure used when a person stops breathing or their heart stops.

CPR forces blood and oxygen to keep flowing through the body.

Figure 2 shows CPR training using a dummy.

Figure 2

Look at **Figure 2** and consider how augmented reality could be used in the training.

Describe **one** way that augmented reality could be used during CPR training to make training more effective.

(2)

2 marks

Using augmented reality a virtual render of a human body needing CPR can be used to show how the blood floods through the body as CPR is being conducted to help the trainee visualise how much pressure to use or just see what is happening inside the body ~~to~~ While CPR is being used to help the student understand

Describe **one** way that augmented reality could be used during CPR training to make training more effective.

(2)

1 mark

Augmented reality could help by shows accurately the ~~the~~ where the hand ~~push~~ should be placed and how quickly should they apply pressure each time in order to do CPR.

Describe **one** way that augmented reality could be used during CPR training to make training more effective.

(2)

0 marks

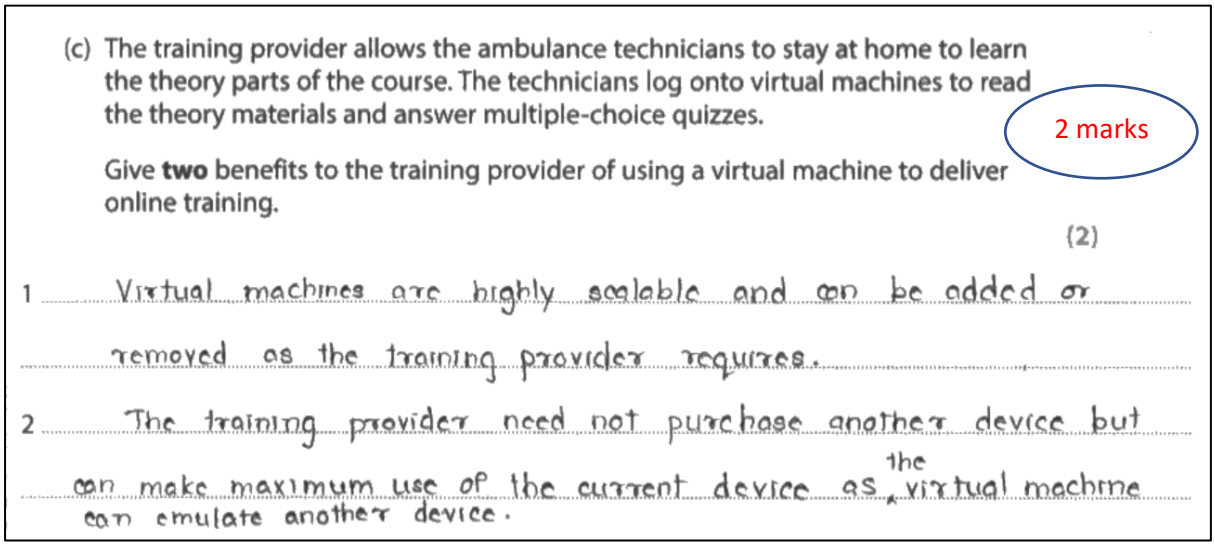
~~Augmented~~ Augmtive reality could replicate the same situation without ~~the~~ risk a actual person. This would remove the risk of life.

Q02c

This question required applying the benefits of VMs to a context.

Some responses failed to contextualise the statements in terms of the training provider. Other responses gave benefits of automating the training, e.g. marking MCQ quizzes, rather than using a virtual machine to deliver the training.

A few responses confused virtual machines with virtual reality.



(c) The training provider allows the ambulance technicians to stay at home to learn the theory parts of the course. The technicians log onto virtual machines to read the theory materials and answer multiple-choice quizzes.

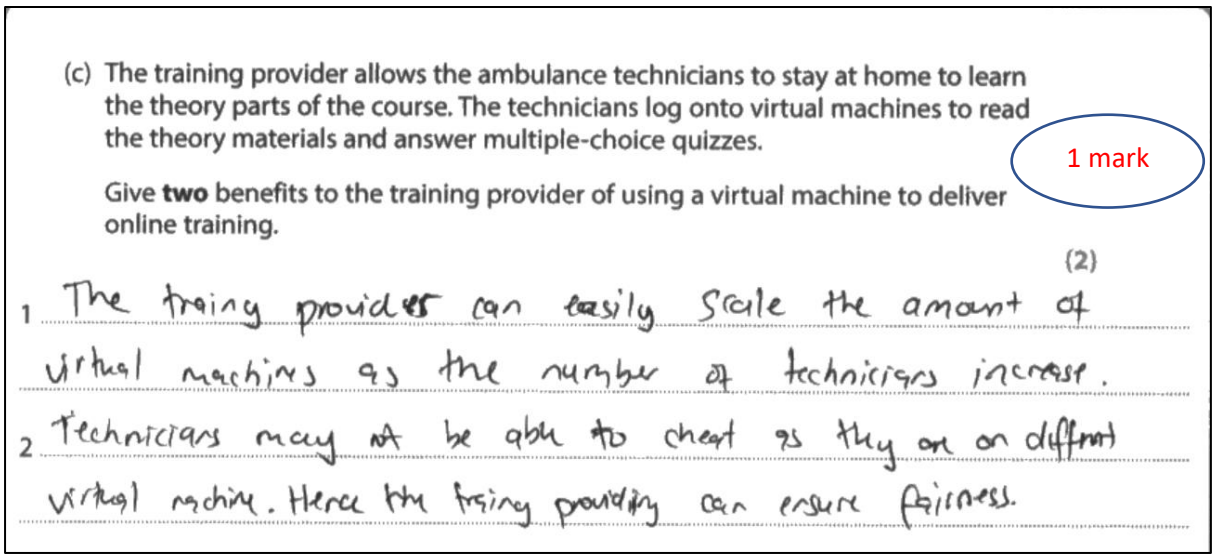
Give **two** benefits to the training provider of using a virtual machine to deliver online training.

2 marks

(2)

1 Virtual machines are highly scalable and can be added or removed as the training provider requires.

2 The training provider need not purchase another device but can make maximum use of the current device as the virtual machine can emulate another device.



(c) The training provider allows the ambulance technicians to stay at home to learn the theory parts of the course. The technicians log onto virtual machines to read the theory materials and answer multiple-choice quizzes.

Give **two** benefits to the training provider of using a virtual machine to deliver online training.

1 mark

(2)

1 The traing provider can easily scale the amount of virtual machins as the number of technicians increase.

2 Technicians may not be able to cheat as they are on diffrent virtual machine. Hence the traing providing can ensure fairness.

(c) The training provider allows the ambulance technicians to stay at home to learn the theory parts of the course. The technicians log onto virtual machines to read the theory materials and answer multiple-choice quizzes.

0 marks

Give **two** benefits to the training provider of using a virtual machine to deliver online training.

(2)

1 Represents hardware-level virtualisation so the bootup speed is stronger. flexibility and scalability.

2 Full isolation and hence more ~~secur~~ secure.

Q02d

This question asked for a mapping between descriptions of situations and the type of artificial intelligence used in that situation.

Examiners saw many very good responses, using subject-specific terminology. The question gave the set of subject-specific terms to be placed into the cells. However, some responses repeated words from the description of the situation in the left column.

(d) Speech recognition, natural language processing and expert systems are types of artificial intelligence.

Complete the table to name which **one** of these types of artificial intelligence is used in **each** situation.

(6)

Situation	Type of artificial intelligence
Technicians use voice-operated devices to give the location of an incident.	
Technicians wear bodycams that record incidents. A computer program transcribes the audio to a text document before it is stored on a server.	
Technicians supply the symptoms of a patient to a computer program. The program diagnoses a heart attack.	
Technicians attend a conference at the end of their training. Transcripts of panel discussions are produced by a computer program.	
Technicians input an image of a spider to a computer program. The program indicates that the spider is venomous.	
Technicians use a computer program to communicate with patients who do not speak English.	

Situation	Type of artificial intelligence
Technicians use voice-operated devices to give the location of an incident.	Speech recognition
Technicians wear bodycams that record incidents. A computer program transcribes the audio to a text document before it is stored on a server.	Speech recognition
Technicians supply the symptoms of a patient to a computer program. The program diagnoses a heart attack.	Expert system
Technicians attend a conference at the end of their training. Transcripts of panel discussions are produced by a computer program.	Natural language
Technicians input an image of a spider to a computer program. The program indicates that the spider is venomous.	Expert system
Technicians use a computer program to communicate with patients who do not speak English.	Natural language processing

4 marks

Situation	Type of artificial intelligence
Technicians use voice-operated devices to give the location of an incident.	speech recognition
Technicians wear bodycams that record incidents. A computer program transcribes the audio to a text document before it is stored on a server.	natural language processing
Technicians supply the symptoms of a patient to a computer program. The program diagnoses a heart attack.	expert system
Technicians attend a conference at the end of their training. Transcripts of panel discussions are produced by a computer program.	natural language processing
Technicians input an image of a spider to a computer program. The program indicates that the spider is venomous.	expert system
Technicians use a computer program to communicate with patients who do not speak English.	speech recognition

2 marks

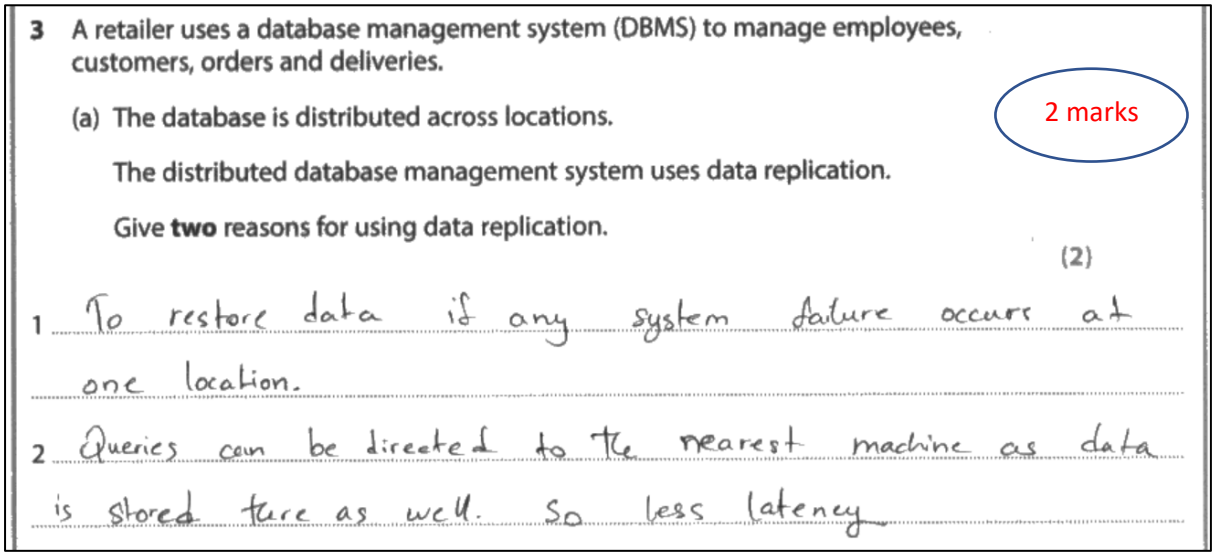
Situation	Type of artificial intelligence
Technicians use voice-operated devices to give the location of an incident.	Audio detection AI
Technicians wear bodycams that record incidents. A computer program transcribes the audio to a text document before it is stored on a server.	Audio interpret AI
Technicians supply the symptoms of a patient to a computer program. The program diagnoses a heart attack.	Crowd Specialize A.I
Technicians attend a conference at the end of their training. Transcripts of panel discussions are produced by a computer program.	
Technicians input an image of a spider to a computer program. The program indicates that the spider is venomous.	Image depiction AI
Technicians use a computer program to communicate with patients who do not speak English.	Language translate AI

0 marks

Q03a

The question requires reasons for using data replication. Definitions of data replication were not awarded marks.

Many responses included the notion of using one database site as a source for restoring data after some form of loss. Other responses included the idea that replication promoted consistency of data across sites.



3 A retailer uses a database management system (DBMS) to manage employees, customers, orders and deliveries.

(a) The database is distributed across locations.

The distributed database management system uses data replication.

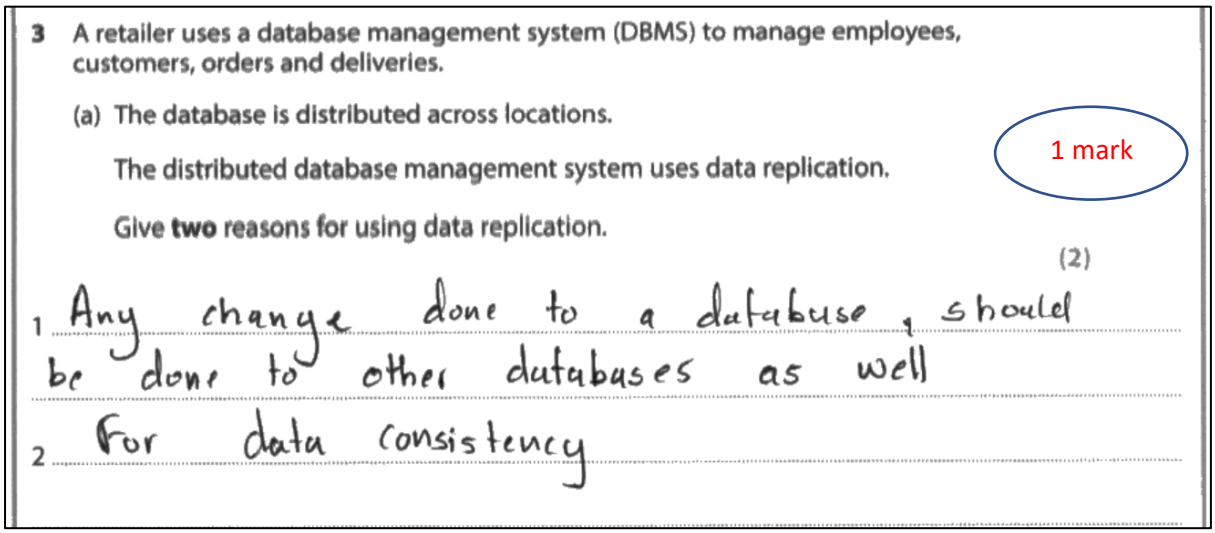
Give **two** reasons for using data replication.

(2)

2 marks

1 To restore data if any system failure occurs at one location.

2 Queries can be directed to the nearest machine as data is stored there as well. So less latency



3 A retailer uses a database management system (DBMS) to manage employees, customers, orders and deliveries.

(a) The database is distributed across locations.

The distributed database management system uses data replication.

Give **two** reasons for using data replication.

(2)

1 mark

1 Any change done to a database, should be done to other databases as well

2 For data consistency

3 A retailer uses a database management system (DBMS) to manage employees, customers, orders and deliveries.

(a) The database is distributed across locations.

The distributed database management system uses data replication.

Give **two** reasons for using data replication.

0 marks

(2)

1 As data will be erased when passing across locations.

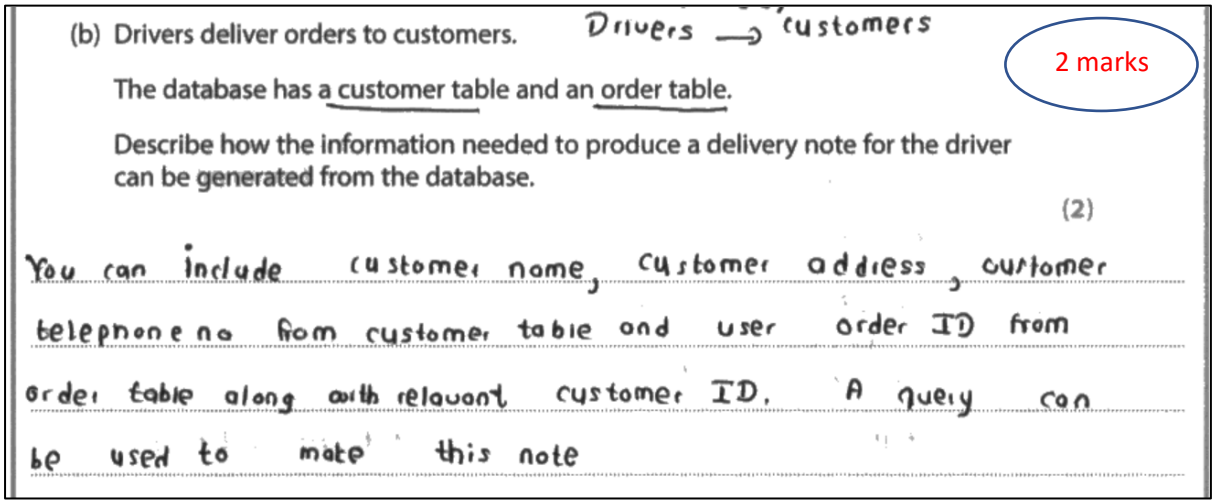
2 As data can be retrived if a mistake was made

Q03b

This question asked about using a database to provide a delivery driver's note. It required contextualised responses.

Many responses were awarded one mark for identifying that a query was required or that fields from the tables were used. Few responses were awarded both marks for a linked description.

Responses that described the relationships between the tables, using keys, were not awarded.



(b) Drivers deliver orders to customers. Drivers → customers

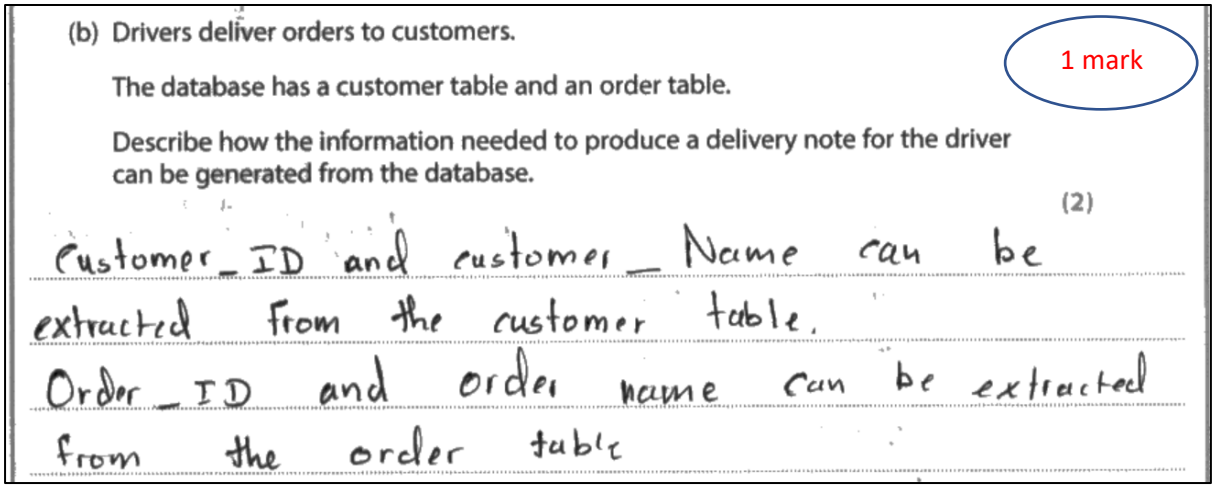
2 marks

The database has a customer table and an order table.

Describe how the information needed to produce a delivery note for the driver can be generated from the database.

(2)

You can include customer name, customer address, customer telephone no from customer table and user order ID from order table along with relavant customer ID. A query can be used to make this note



(b) Drivers deliver orders to customers.

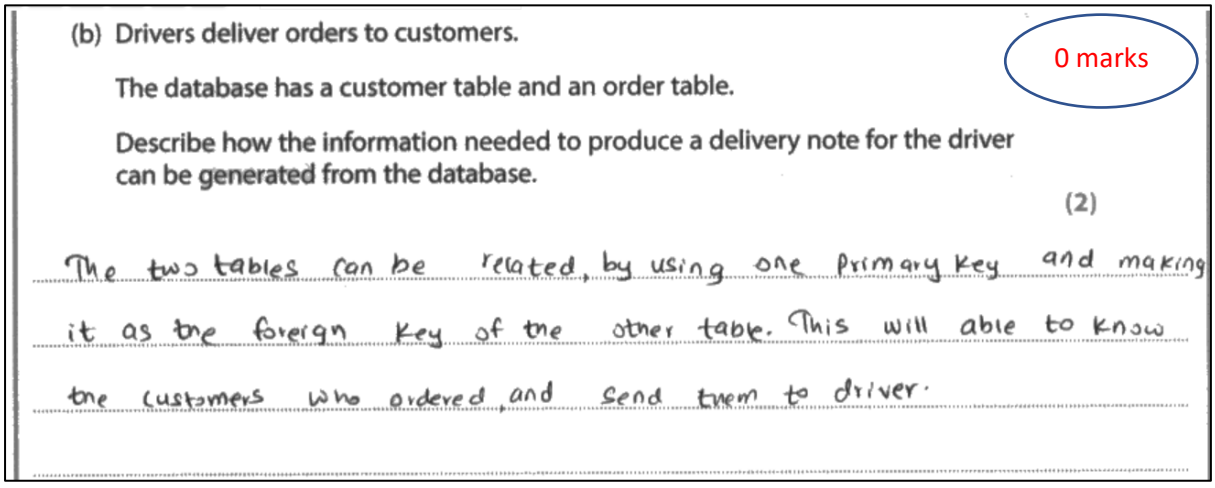
1 mark

The database has a customer table and an order table.

Describe how the information needed to produce a delivery note for the driver can be generated from the database.

(2)

Customer_ID and customer_Name can be extracted from the customer table. Order_ID and order name can be extracted from the order table



(b) Drivers deliver orders to customers.

0 marks

The database has a customer table and an order table.

Describe how the information needed to produce a delivery note for the driver can be generated from the database.

(2)

The two tables can be related, by using one primary key and making it as the foreign key of the other table. This will able to know the customers who ordered and send them to driver.

Q03c

This question asks about the data dictionary that would underpin the design of a database table.

Examiners saw many good responses that used subject-specific terminology.

Recurring incorrect responses included failing to identify empID as a primary key, the lastName field length being too short, and phone numbers stored as numbers rather than text.

Auto-number was awarded where it appeared instead of an integer for empID. However, an auto-number field is not automatically a primary key. Therefore, auto-number was not awarded in the comment column for empID.

(c) **Figure 3** shows part of a completed form for a new employee.

Office use only		ID: 9876543	
Last name	Schreck		
Telephone	0426452774	Date of birth	18-05-1990
Do you drive? (y/n)		Y	
Accident free (whole years)		8	

Figure 3

Complete the data dictionary for the employee part of the database.

Employee IDs are automatically allocated sequentially.

Telephone numbers use the standard format shown.

5 marks

(6)

Name	Data type	Size	Required	Comment
empID	Number		Yes	It is the primary key
lastName	text	20	Yes	
phone	Number	10		
dob	Date			
drive	True or false			
accidentFree	Number			

Complete the data dictionary for the employee part of the database.

Employee IDs are automatically allocated sequentially.

Telephone numbers use the standard format shown.

5 marks

(6)

Name	Data type	Size	Required	Comment
empID	Auto-number		Yes	Auto generated id. Do not enter.
lastName	text	50	Yes	
phone	text	10		
dob	Date			
drive	Yes/No			
accidentFree	int			

Complete the data dictionary for the employee part of the database.

Employee IDs are automatically allocated sequentially.

Telephone numbers use the standard format shown.

4 marks

(6)

Name	Data type	Size	Required	Comment
empID	text		Yes	Serial number
lastName	text	30	Yes	
phone	Number	15		
dob	~~yes/no~~ date			
drive	Yes/no			
accidentFree	number			

Complete the data dictionary for the employee part of the database.

Employee IDs are automatically allocated sequentially.

Telephone numbers use the standard format shown.

3 marks

(6)

Name	Data type	Size	Required	Comment
empID	Integer		Yes	NNNNNNN
lastName	Text	< 50	Yes	
phone	Integer	11		
dob	Date			
drive	Y/N			
accidentFree	Year			

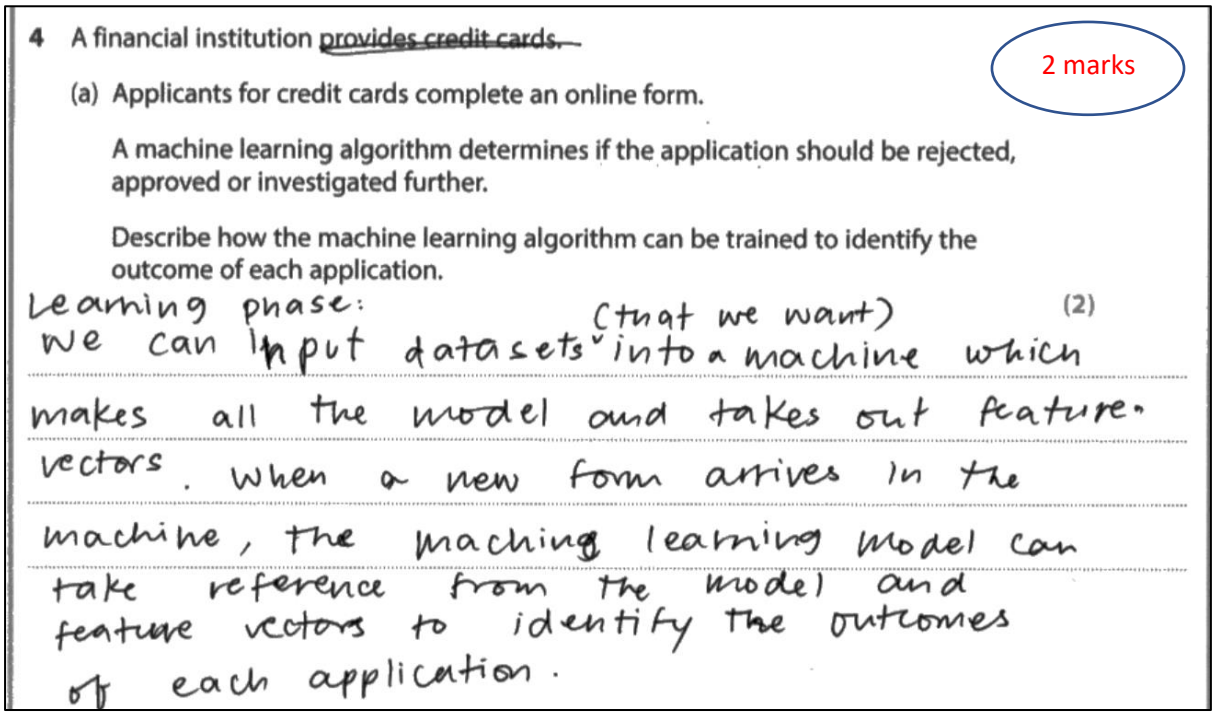
Q04a

This question asked about training a machine learning algorithm.

Many responses were awarded one mark for identification of supervised learning, although some failed to use that subject-specific terminology.

Responses that were not awarded the second mark, usually lacked an indication of how the learning impacted future decisions.

Responses that were awarded no marks, usually described procedural steps, such as validation, rather than machine learning.



4 A financial institution ~~provides credit cards.~~

2 marks

(a) Applicants for credit cards complete an online form.

A machine learning algorithm determines if the application should be rejected, approved or investigated further.

Describe how the machine learning algorithm can be trained to identify the outcome of each application.

(2)

Learning phase:
we can input datasets (that we want) into a machine which makes all the model and takes out feature vectors. When a new form arrives in the machine, the maching learning model can take reference from the model and feature vectors to identify the outcomes of each application.

4 A financial institution provides credit cards.

2 marks

(a) Applicants for credit cards complete an online form.

A machine learning algorithm determines if the application should be rejected, approved or investigated further.

Describe how the machine learning algorithm can be trained to identify the outcome of each application.

(2)

The ~~math~~ algorithm can be given a ~~list~~ a data set ~~of~~ containing applications and their results, the algorith- can then find patterns between successfull and unsuccessfull ~~algor~~ applications to predict the outcome of future applications.

4 A financial institution provides credit cards.

1 mark

(a) Applicants for credit cards complete an online form.

A machine learning algorithm determines if the application should be rejected, approved or investigated further.

~~Describe how the machine learning algorithm can be trained to identify the~~ outcome of each application.

(2)

The machine learning algorithm to identify through the outcome of each application ~~can be~~ supervised ~~trained using~~ learning where algorithms are trained using labeled data.

4 A financial institution provides credit cards.

0 marks

(a) Applicants for credit cards complete an online form.

A machine learning algorithm determines if the application should be rejected, approved or investigated further.

Describe how the machine learning algorithm can be trained to identify the outcome of each application.

(2)

Once the form is submitted, the machine use statistical analysis and check whether the form is completed. If so approving and if not it will reject or ~~a~~ will investigated further.

Q04b

The short essay question asks for a discussion of obtaining, storing, and using Big Data in the context of a financial institution.

A range of marks was awarded for this essay question. Marks were awarded in all three levels-based mark scheme bands.

Essays awarded marks in Level 3 demonstrated good knowledge and understanding of Big Data and were able to apply that in the context of a financial institution.

5 marks

(b) Financial institutions use Big Data to make decisions.

Discuss how a financial institution could obtain, store and use analytics on Big Data.

(6)

The institution could obtain big data through credit-card spending records, using TP systems. It could have access to bank records containing the details of customers, such as age, sex, occupation and spending patterns. Publicly published tax reports of large businesses could be used.

It could employ a Database for storage lake, where all the unstructured big data gathered is pooled into. This could be stored in large storage facilities or using local hardware, or by uploading the data to the cloud, however due to the volume and velocity that may not be possible. Physical integrity of the data must be ensured with appropriate security at the data centre.

Descriptive analysis could analyse the past spendings of the population during different phases of the economy.

Prescriptive analysis could be used to advise governments, or people as to how they should manage their spending according to current economic trends.

Predictive analysis could analyse the future incomes and tax expenditure of the population. Softwares could be used as well as machine learning to extract patterns from Big Data

(b) Financial institutions use Big Data to make decisions.

5 marks

Discuss how a financial institution could obtain, store and use analytics on Big Data.

(6)

for obtaining big data it could :-

=) store all the potential customers personal information for targetted marketing

=) it could store all the purchasing habits of regular credit card users to offer them bigger credit card package with rewards.

=) it could obtain regular customers of larger businesses who make bigger purchases every now and then as they could be potential users for credit cards.

for storing big data :-

=) it could use cloud ~~storage/infrastructure~~ storage/infrastructure as it is scalable. meaning that it could be increased in storage size when needed and you only pay for how much needed making it cost effective.

=) it could use a good power supply to ensure that data is being generated at a faster speed since the bandwidth needs to be higher - could use a fibre optic cable for faster data transmission.

=) a data warehouse could be used as it stores data from different branches in a secure manner.

for using analytics on big data :-

=) it could identify the trends between purchasing as this may allow them to know when a customer makes a large purchase - allowing them to enforce targetted marketing.

=) could use it for decision making. For instance - whether to launch a new credit card or no.

3 marks

(b) Financial institutions use Big Data to make decisions.

Discuss how a financial institution could obtain, store and use analytics on Big Data.

(6)

- Big data consist of Variety (one of the Vs) of data, therefore financial ~~institutions~~ institutions may be able to obtain variety of data; allowing them to have all sects of information needed before making a decision. Such as the budget, the performance and years worked by an employee could be taken in regard before making the decision for increment of a certain employee.
- Big date consists of Validity (one of the Vs) of data, therefore financial institution could store accurate data. Furthermore, leading to accurate decision making and resulting in efficiency increased.

-However, Big data can require a team and be very time consuming for the institution. Also, hiring a team can be expensive.

(b) Financial institutions use Big Data to make decisions.

2 marks

Discuss how a financial institution could obtain, store and use analytics on Big Data.

(6)

The financial institution can use different sources of information such as google or media to obtain vast amount of information.

Than, they can store that information in the database. In order to remove data duplications they can use normalisation. Also, they sort all that data by structuring the database and creating additional tables that are in relationship.

This way of storing data makes it easier to analyse them. The financial institution can use machine learning algorithms for analytics.

Moreover, they can sort they data by associations and group them in clusters during the data mining, that can be used to obtain Big Data.
Also, they can use the regression or prediction techniques to predict the future financial situations based on historical data or past patterns.

Q04c

This question required completion of an information flow diagram.

The majority of responses was awarded marks for naming the entities in the boxes. Some responses acknowledged that the sort code and bank account of two entities were involved. Many responses did not clearly indicate if the movement of funds were a credit or a debit.

There were a few responses which attempted to describe the processes, e.g. actions, that each entity undertook. The question identifies the diagram as an information flow diagram, requiring destinations and information.

(c) A customer pays the balance of a credit card account using Bacs Payment Schemes.

Figure 4 shows a credit card account statement.

The full balance must be paid.

XYZ Bank

Credit card account

Robin Redmond
120 Leeming Street, Tidchester TD1 5WP

Account number	**Sort code**	**Statement date**
12345678	12-34-56	01 August 2018 to 31 August 2018

Date	**Description**	**Spend**	**Payment**	**Balance**
01 Aug 2018	Opening			783.35
	Total spend	456.12		
	Total payments		783.35	
31 Aug 18	Closing balance			456.12

Bacs payments: Account number 99875234 Sort code 17-18-19

Figure 4

The payment transfer takes up to three full days.

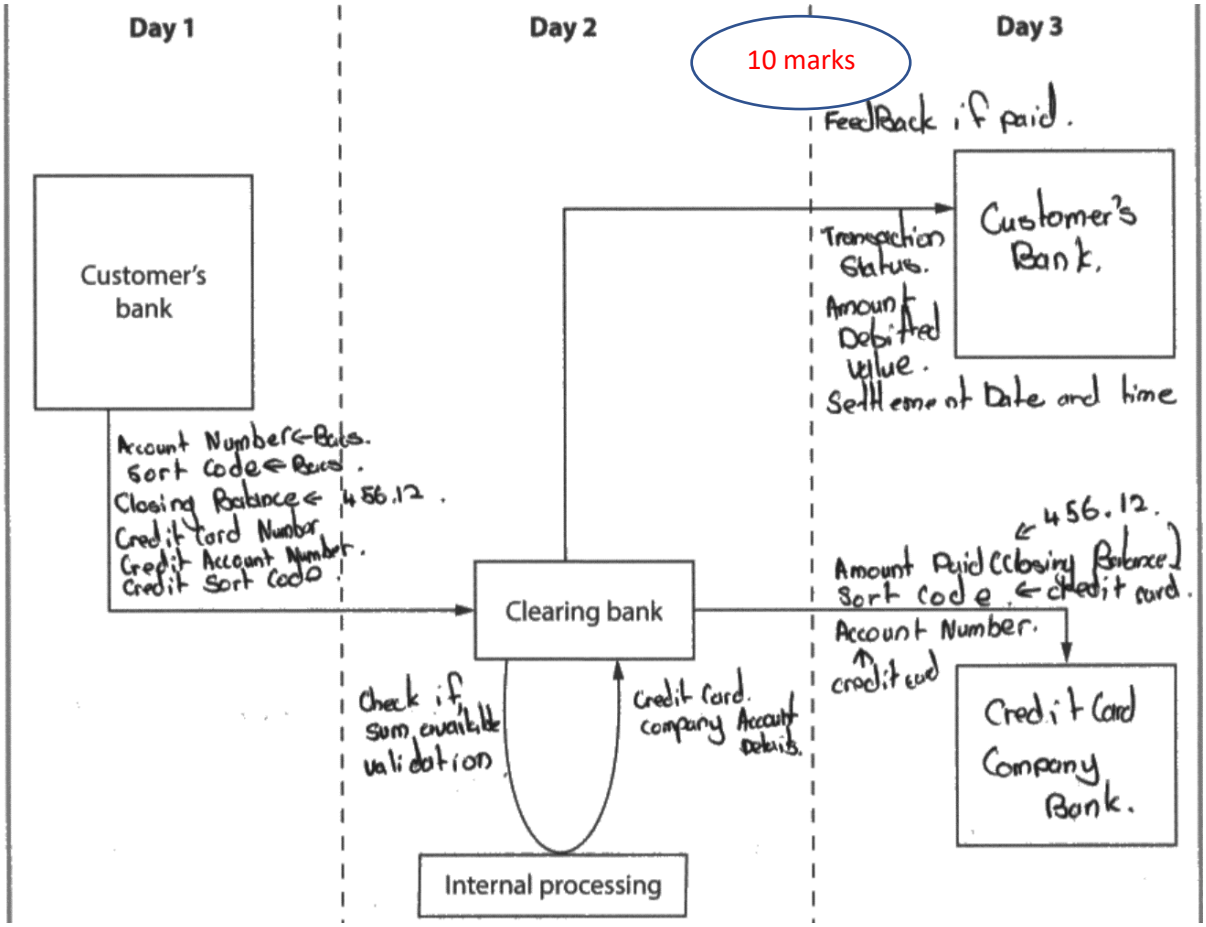
The transfer involves three different banks: the customer's bank, the credit card company's bank and a clearing bank.

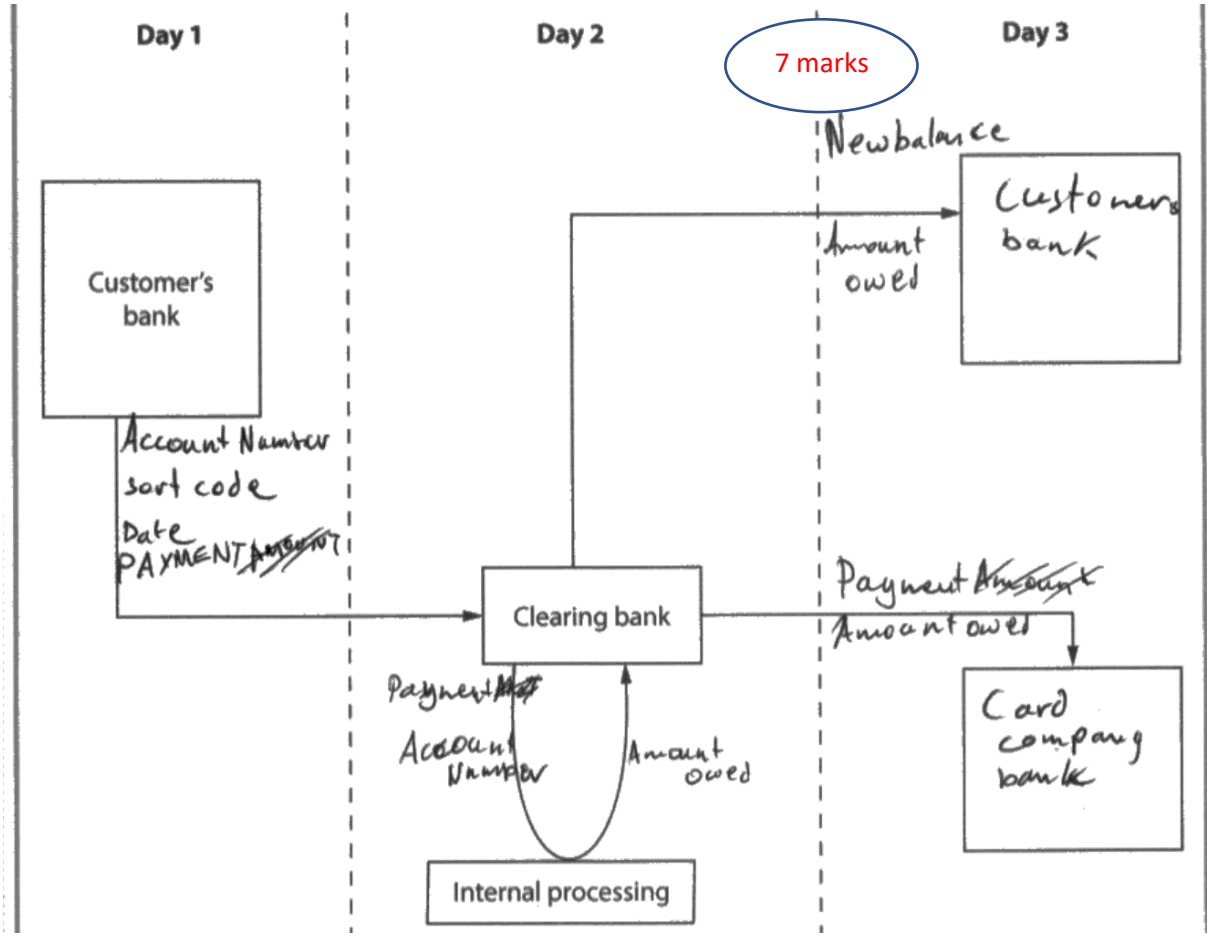
The clearing bank acts as a go between. It needs one day for its own internal processing.

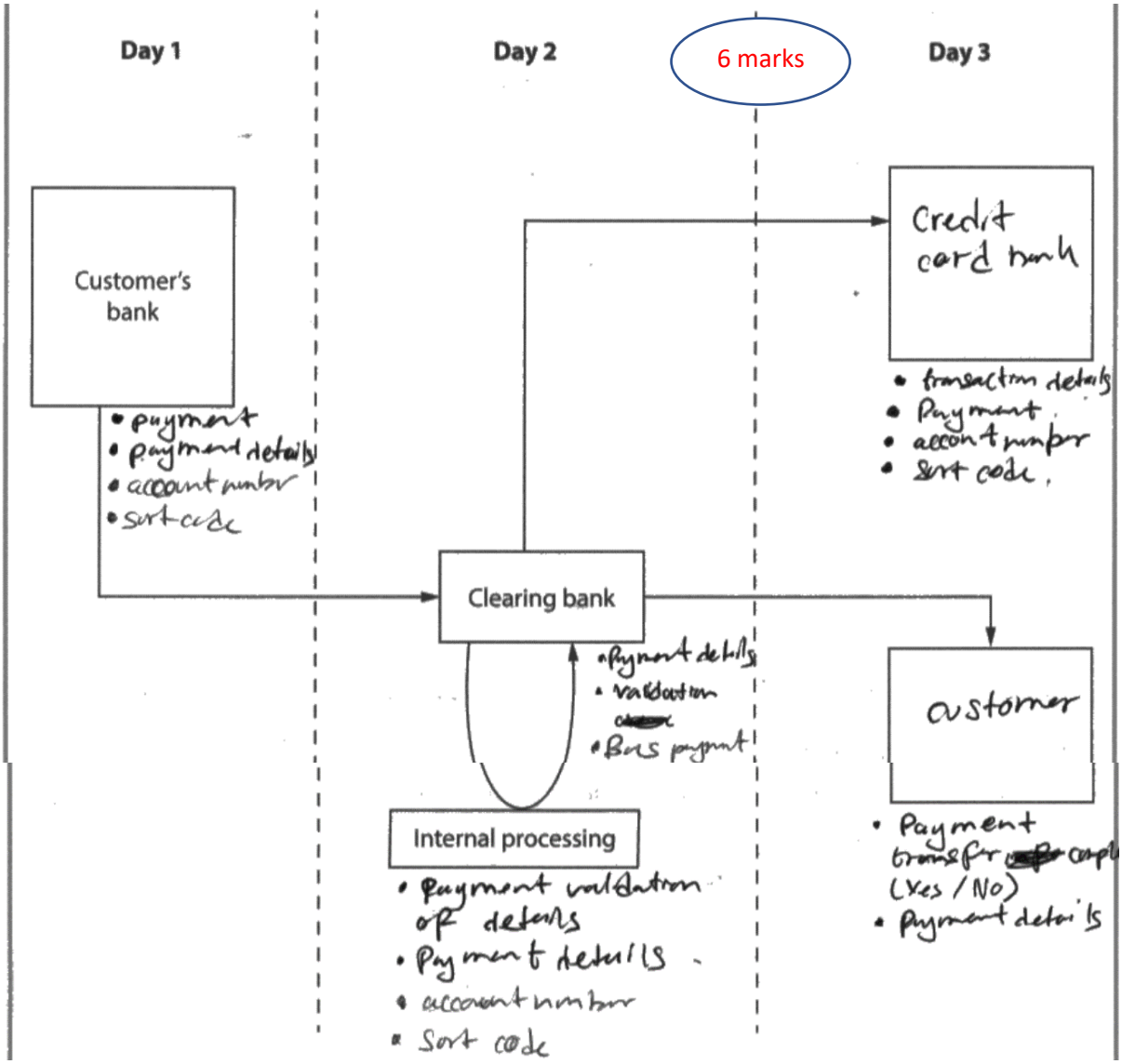
The customer needs to pay the credit card company the balance owed.

Complete the information flow diagram to show the destinations and information flows for the payment transfer.

(10)


Day 1
Day 2
Day 3
10 marks
Feedback if paid.
Customer's bank
Customer's Bank.
Transaction Status.
Amount Debited value.
Settlement Date and time
Account Number ← Bacs.
Sort Code ← Bacs.
Closing Balance ← 456.12.
Credit Card Number
Credit Account Number.
Credit Sort Code
Clearing bank
← 456.12.
Amount Paid (Closing Balance)
Sort Code ← Credit card.
Account Number.
credit card
Credit Card Company Bank.
Check if sum available validation.
Credit Card. company Account details.
Internal processing


Day 1
Day 2
Day 3
7 marks
Newbalance
Customer's bank
Amount owed
Customers bank
Account Number
sort code
Date
PAYMENT
Clearing bank
Payment
Amount owed
Card company bank
Payment
Account Number
Amount owed
Internal processing


Day 1
Day 2
6 marks
Day 3
Customer's bank
Credit card bank
Clearing bank
customer
Internal processing

Q05

The long essay question asks for an evaluation of an MIS system in the context of a college.

A range of marks was awarded for this essay question. Marks were awarded in all three levels-based mark scheme bands.

Responses awarded in Level 3 were in the context of the college and considered benefits and drawbacks of using an MIS for a variety of functions.

While it is a good idea to use the bullets to guide writing the essay response, it is not necessary to address every bullet with a benefit and a drawback. In some scenarios, there may be a very clear benefit and no clear drawback, or vice versa. Trying to find one can lead to inclusion of vague or inaccurate information.

5 A college has 4,000 students and 250 members of staff.

College staff are full-time or part-time employees. Some staff are trained in first aid.

Students are required to register for each class. Attendance is monitored closely.

The college has a library. An annual project reports on library stock, usage and spending.

The college cafeteria sells snacks and meals. An ongoing project is monitoring and ordering of supplies.

Evaluate the benefits and drawbacks for the college of using a management information system (MIS).

You could consider:

- record keeping
- decision making
- project management
- issues of implementing a management information system (MIS).

(12)

10 marks

The college could use Management Information system to manage the data / IT systems in the college. Firstly MIS could be used for record keeping which could allow the storing of data such as student information or stock management in the cafeteria to record the orders of the snacks & meals and could also be used to record information of library keeping track on library stock. The benefits could be that the college could easily track the students, their number, details or information which could be used while paying fees etc. MIS could also be used to track the stock of the cafeteria so that the snacks and meals could be ordered on line. Record keeping allows the college to keep a track of all the records which could then be used to make decisions, for example which class attracts most of the students that way they could arrange a larger class for those students or they could move

about which snack or meal is preffered the most and could be ordered less or more, that way they could save money rather than wasting resources on purchasing extra stock that may go expired or unused. The record / data of the staff could be used to make decisions on how many staffs should be hired [if the company needs full time or part-time employees] etc. The attendence could also be recorded using the MIS system which allows to keep track of each student. MIS could also be used in project management it could provide tools to build annual project reports on library stock, tracking which stocks ends when and how much library wage is done and manages the ordering of the supplies. It helps to set a time bound and deadline and may divide tasks and track the project. However implementing a management information system could be costly and the college may need to hire IT professions / staffs to manage the MIS, as the data could be entered incorrectly leading to incorrect decisions - such as the record taking information about the inventory could be incorrect as data entered is the It could be costly to the organisation but since an MIS system allows data to be handled accurately that means the advantages outweigh the disadvantages [security issues & unreal] and since the college holds 4000 students and 250 mentors & staffs which is a great number that means it should implement MIS system even though it would be difficult for the staffs / students to adjust to MIS, for example teachers might be recording student's attendance on a written material which would be difficult to switch to another team]

(Total for Question 5 = 12 marks)

6 marks

A management information system is used to keep track of the stock, how much people are spending and how often its used.

The MIS will help the library keep track of more books within a shorter time, this reduces the issue of human error as record keeping can be a tiring process to do. Some books may not be in the database so the MIS might have issues when it can't find the barcode to scan the book.

Secondly, an MIS can help the library view the usage of each book. They can use this to help decide between decisions. For example, if more non fiction books are being borrowed compared to fictional

ones, its time to invest in more books that are non fictional to suffice the consumers. They could also use this information to decide which foods are liked more in the cafeteria so they can order more.

When it comes to project management the MIS can identify staff that are free without any thing to do and assign them to a certain task. This can improve the time it takes for projects to be completed. They can manage all these data streams from the cafeteria, the library and the staff to create reports at the end of the year to analyze and reflect on how far they've come as well as what they can improve on.

A MIS can often be a very costly purchase to the college and based on how many tasks to deal with it might require more processing power, RAM ~~ex~~, etc. The MIS can also be a learning curve for employees that are stuck in their ways so they might make mistakes when recording onto the MIS and so it will incur additional training costs that may impact the college.

(Total for Question 5 = 12 marks)

Overall I think the pros outweigh the cons as it will be much easier to manage all the projects there.

3 marks

Using a management information system (MIS) in a place where many people work has benefits as well as some drawbacks.
The college has 4,000 students and 250 staff members which a large amount. The college library which is been used by the students as well as the teachers has many works happening within a day, since there is a big crowd. There also may have many books in the college library. The books in the college library may be borrowed to take home to read, or it may be borrowed to read within the library. So when the books are being borrowed from students and teachers of the college they could be misplaced.

By the books been misplaced or lost the college will get a lost in books, that therefore they will have to invest extra money on the library. Thereby using a management information system would be easier to identify the books as well as the children and the staff members. And also the usage of the books in the library can be monitored so that they could identify the patterns and trends within the students and the college staff. So ~~when the college~~ the college could purchase the books that will be needed. And by doing so it would ~~save~~ cost low-money by only purchasing the needed books.

The college cafeteria which sells snacks and meals has a big role playing in the college, by providing the college students and staff the food they needed. Since there is a large crowd there will be need many snacks and meals needed. And it has to be supplied without any drop of food. There by the MIS it could be checked and the supplies can be ordered without any delay in the meals. Therefore the Management information system is beneficial.

By using the Managment information system it is required to invest more money by the college which will be an additional charge to the college, which could be considered as a drawback.

Q06a

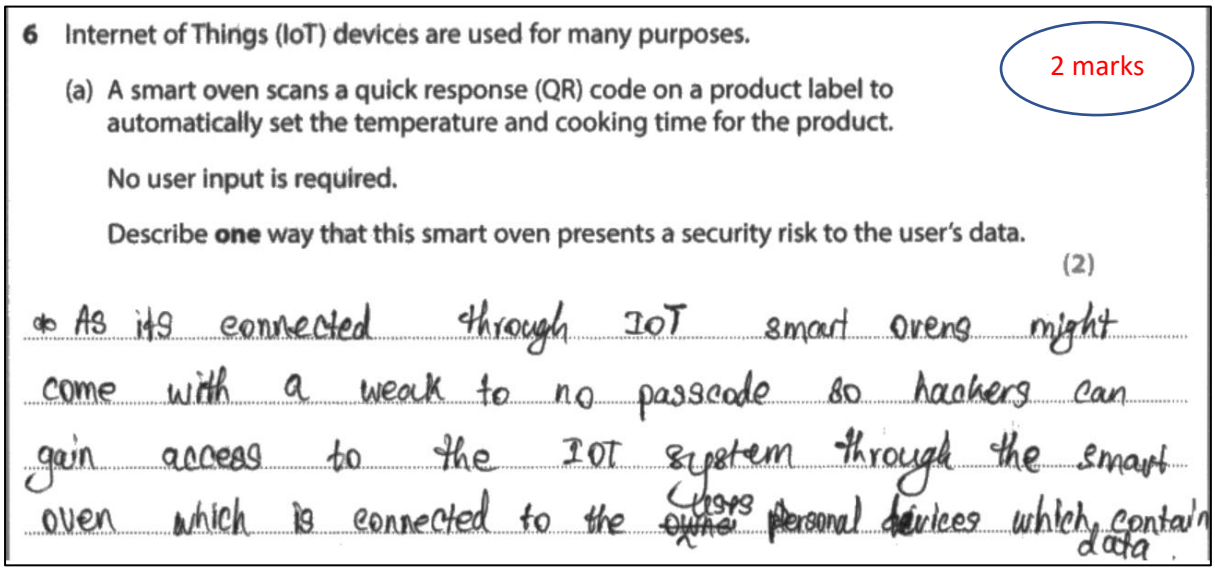
This question asked about the security risk of an oven that is part of the IOT.

Examiners saw many responses that identified bad things that could happen, such as burning food or data being stolen. These were not awarded marks. The question asks for a way that the oven is a risk, not what happens as a result of the risk being taken advantage of.

Responses that described the idea of the home network being accessed by unauthorised people were awarded one mark.

Responses that were awarded two marks identified a risk, such as factory default password on the oven, linked to an action that it allowed, such as taking control of the camera in the oven.

Common inaccurate responses included faulty, malformed, or malicious QR codes; incorrect scanning of a QR code; or bugs in the software.



6 Internet of Things (IoT) devices are used for many purposes.

(a) A smart oven scans a quick response (QR) code on a product label to automatically set the temperature and cooking time for the product.

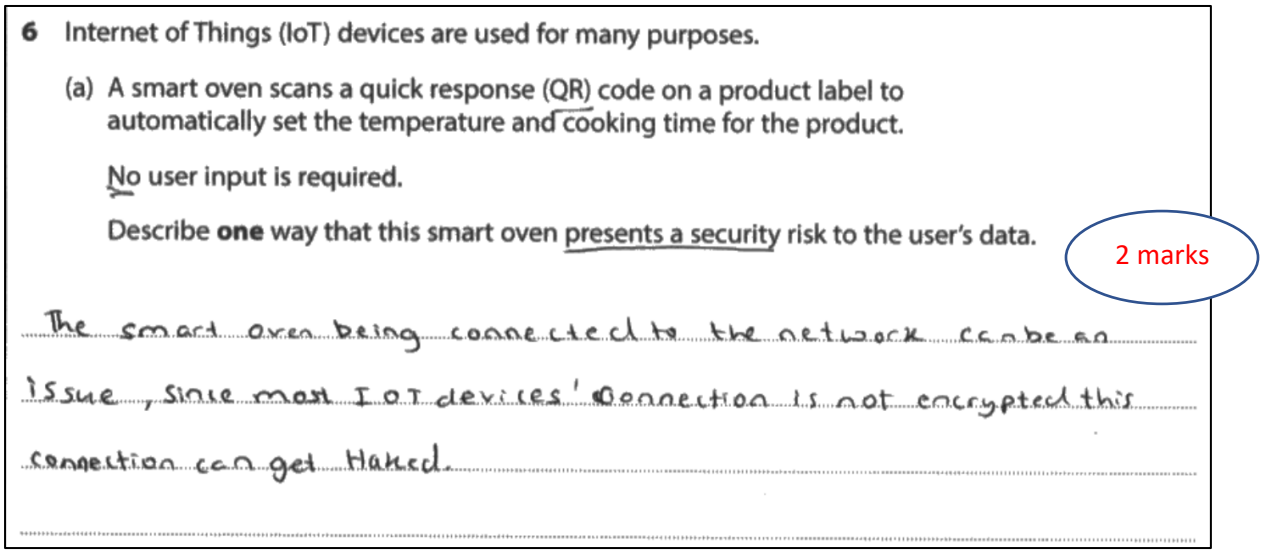
No user input is required.

Describe **one** way that this smart oven presents a security risk to the user's data.

(2)

2 marks

* As its connected through IoT smart ovens might come with a weak to no passcode so hackers can gain access to the IOT system through the smart oven which is connected to the ~~owners~~ users personal devices which contain data.



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(a) A smart oven scans a quick response (QR) code on a product label to automatically set the temperature and cooking time for the product.

No user input is required.

Describe **one** way that this smart oven presents a security risk to the user's data.

2 marks

The smart oven being connected to the network can be an issue, since most IOT devices' connection is not encrypted this connection can get Hacked.

6 Internet of Things (IoT) devices are used for many purposes.

1 mark

(a) A smart oven scans a quick response (QR) code on a product label to automatically set the temperature and cooking time for the product.

No user input is required.

Describe **one** way that this smart oven presents a security risk to the user's data.

(2)

Smart oven are mostly connected to the internet or WAP in the house, this can lead to security concerns as the location or IP address can be leaked and hacked by smart oven

6 Internet of Things (IoT) devices are used for many purposes.

0 marks

(a) A smart oven scans a quick response (QR) code on a product label to automatically set the temperature and cooking time for the product.

No user input is required.

Describe **one** way that this smart oven presents a security risk to the user's data.

(2)

Data can be ~~stolen~~ stolen if ~~it is not scans a QR code that is~~ the oven is thrown away after usage.

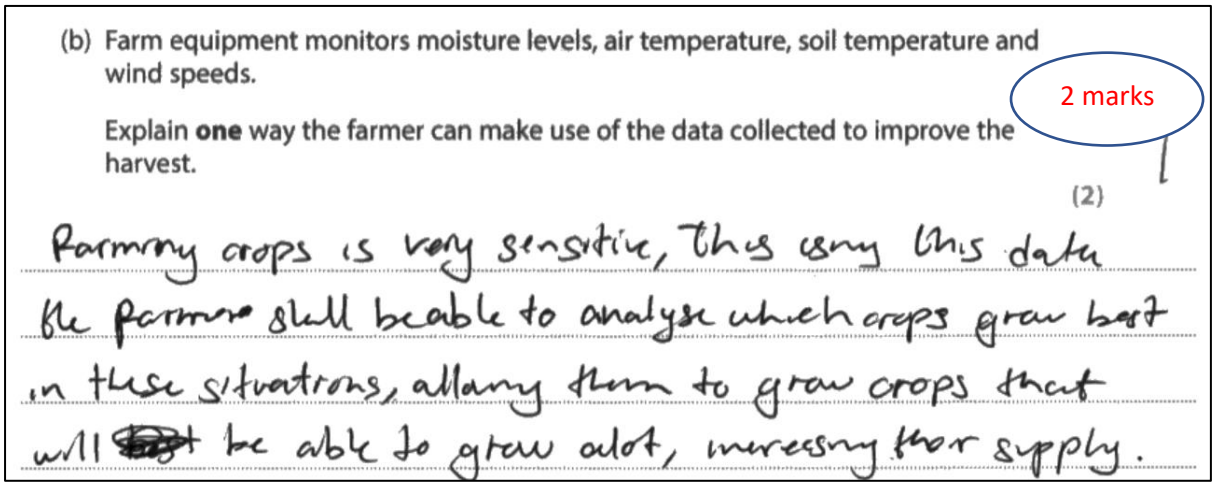
Q06b

This question asked about ways that the data collected by IOT devices could help improve crop harvests.

Examiners saw many responses that identified actions that the farmer could take, such as increase watering or knowing when to harvest. These responses were awarded one mark.

In many responses, it was not clear how the farmer used the collected data. The question states that the variables are monitored and that the data is already collected.

Responses that were awarded two marks identified how the data was used, such as to predict growth patterns, as well as an action the farmer could take, such as adding more fertiliser.



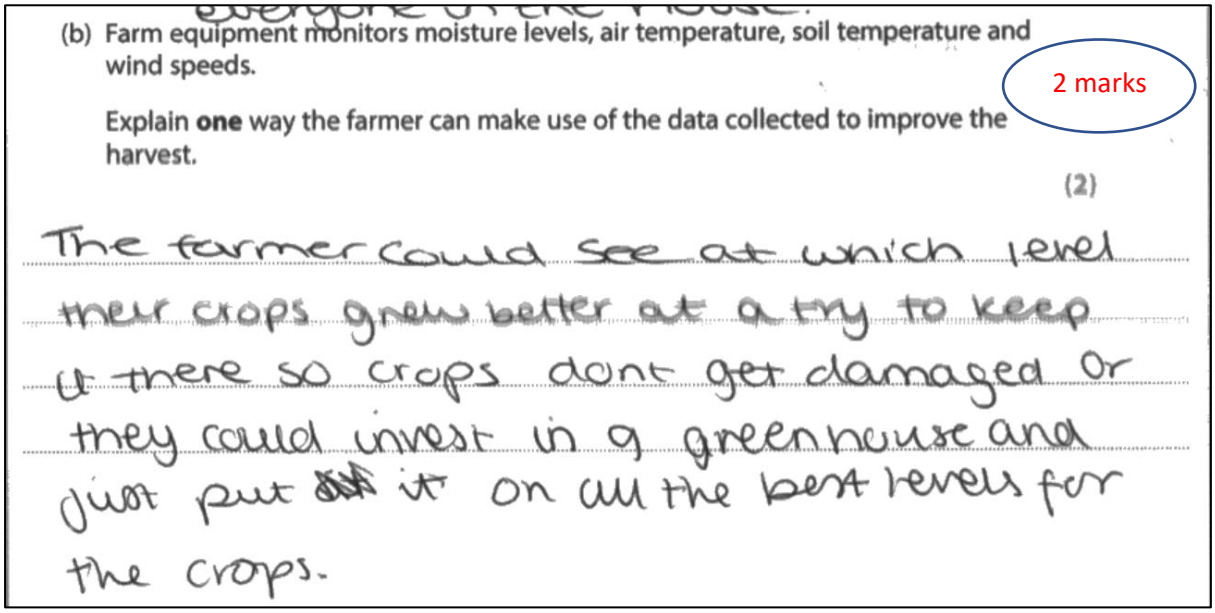
(b) Farm equipment monitors moisture levels, air temperature, soil temperature and wind speeds.

Explain **one** way the farmer can make use of the data collected to improve the harvest.

2 marks

(2)

Farming crops is very sensitive, This using this data the farmer shall be able to analyse which crops grow best in these situations, allowing them to grow crops that will ~~not~~ be able to grow alot, increasing their supply.



(b) Farm equipment monitors moisture levels, air temperature, soil temperature and wind speeds.

Explain **one** way the farmer can make use of the data collected to improve the harvest.

2 marks

(2)

The farmer could see at which level their crops grew better at a try to keep it there so crops dont get damaged or they could invest in a greenhouse and just put ~~it~~ it on all the best levels for the crops.

(b) Farm equipment monitors moisture levels, air temperature, soil temperature and wind speeds.

Explain **one** way the farmer can make use of the data collected to improve the harvest.

(2)

1 mark

By using the moisture levels, the Farmer will be able to identify if the harvest needs more watering or not. If the moisture level is high, the farmer will stop watering the harvest for some time until it reaches the Standard value.

(b) Farm equipment monitors moisture levels, air temperature, soil temperature and wind speeds.

Explain **one** way the farmer can make use of the data collected to improve the harvest.

(2)

0 marks

The farmer can measure the amount of harvest, air temperature, soil temperature and wind speeds.

Q06c

This question required completion of a precedence table and an activity on arc network diagram.

The question sets out exactly what is required to complete the diagram including the number and type of arrows and values.

Examiners saw some responses that achieved full marks. However, there were some responses that added nodes, which were not required.

(c) The makers of a range of wearable IoT devices are demonstrating their products at a trade show.

On the opposite page are:

- a partially completed precedence table for setting up the equipment
- a partially completed activity on arc network diagram representing the precedence table.

Complete the precedence table by:

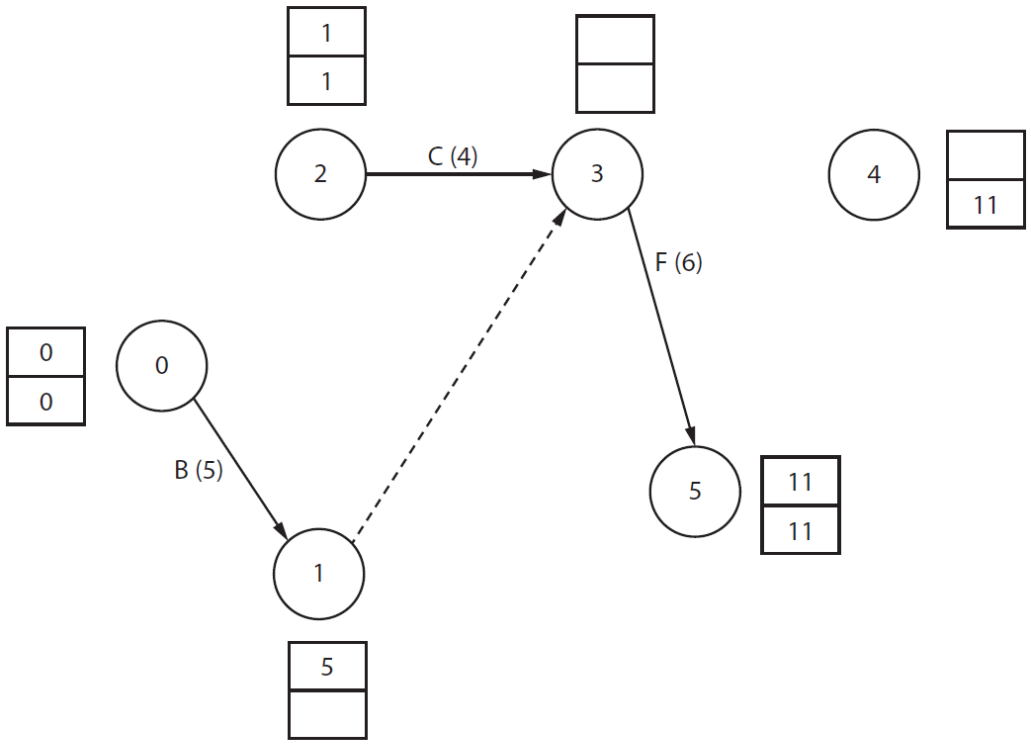
- adding the values for the predecessors of activity F.

Complete the activity on arc network diagram by:

- adding and labelling **three** arrows
- adding **one** dummy arrow
- adding **four** missing values for the early and late event times.

(10)

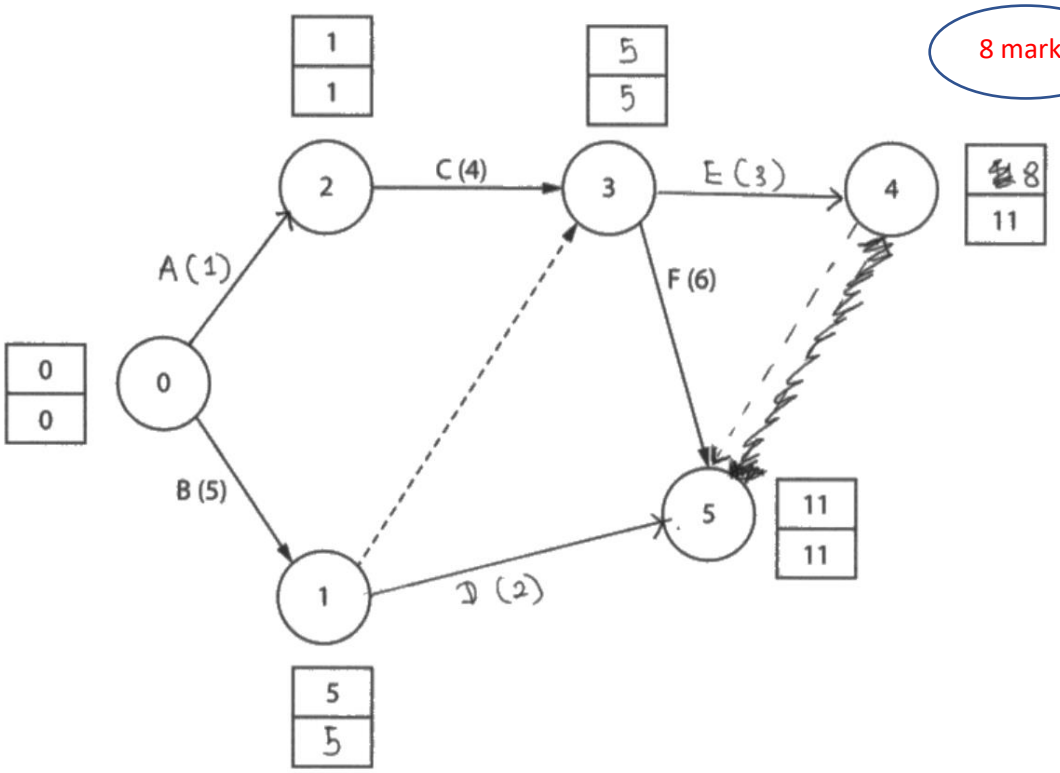
Activity	Task	Duration	Predecessor
A	Unpack and set out wearables	1	–
B	Ensure tablets are working with trade show Wi-Fi	5	–
C	Ensure wearables are working with trade show Wi-Fi	4	A
D	Accept online terms and conditions for trade show Wi-Fi usage	2	B
E	Test wearable statistics are updated on tablets	3	B, C
F	Test historical graph matches on tablets and wearables	6	



(Total for Question 6 = 14 marks)

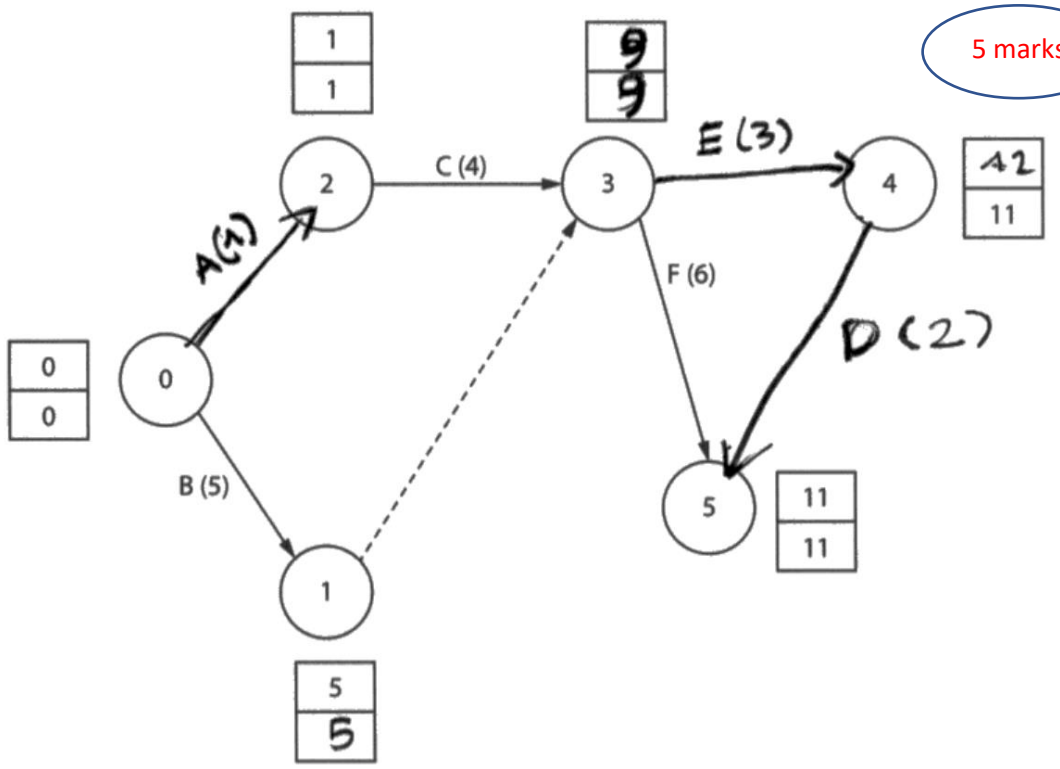
F	Test historical graph matches on tablets and wearables	6	D, E

8 marks



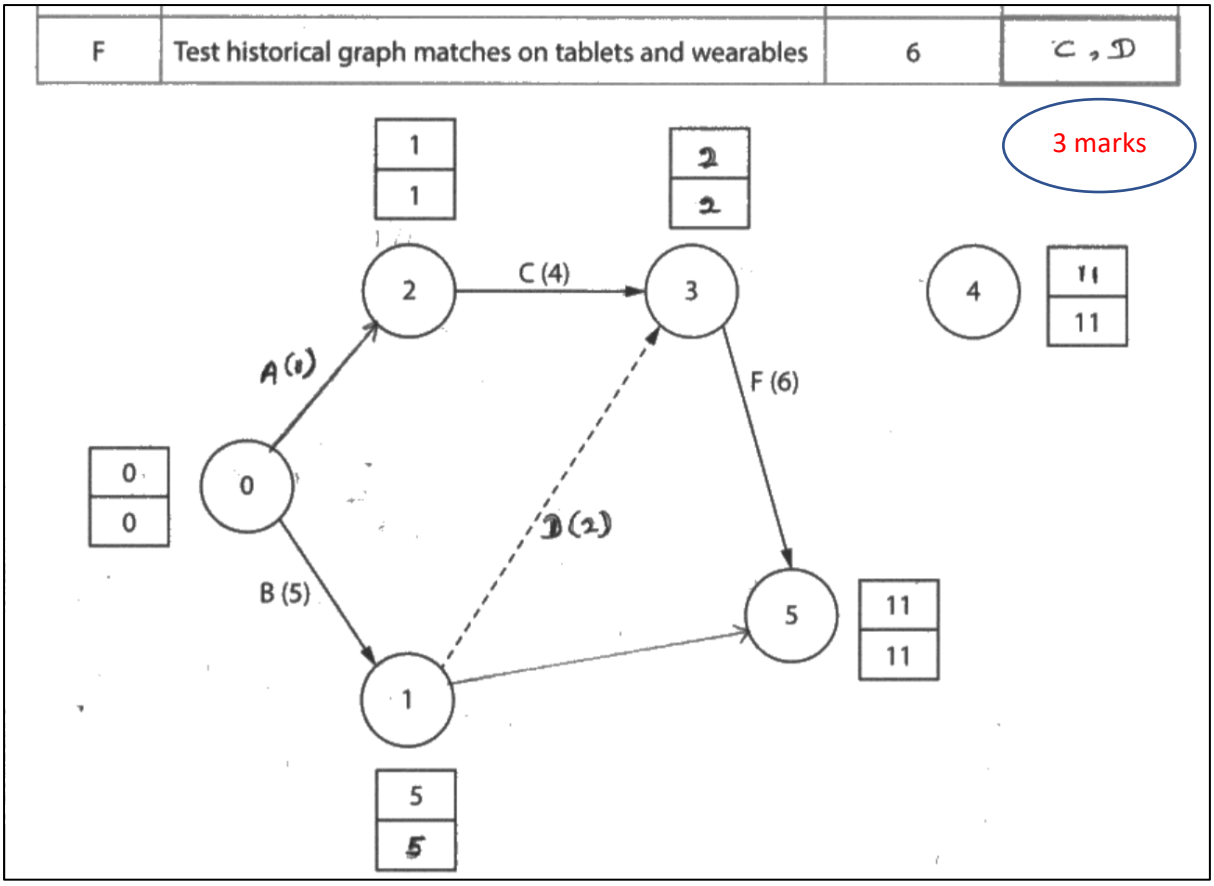
F	Test historical graph matches on tablets and wearables	6	B, C

5 marks



F	Test historical graph matches on tablets and wearables	6	C , D

3 marks



Summary

- Use subject-specific terminology and notation accurately in all responses
- Provide a statement and a linked expansion for two-mark explain and describe questions
- Identify the requirements of the response from the command word used in the question
- Ensure your response is phrased in the context of the question, if there is one
- Use the bullets provided in the large essay question to structure your response