SUPERVISOR TO ATTACH PROCESSING LABEL HERE

Letter

STUDENT NUMBER

COMPUTING: INFORMATICS
Written examination

Friday 15 November 2019

Reading time: 3.00 pm to 3.15 pm (15 minutes)
Writing time: 3.15 pm to 5.15 pm (2 hours)

QUESTION AND ANSWER BOOK

Structure of book

Section	Number of questions	Number of questions to be answered	Number of marks
A	20	20	20
B	8	8	30
C	10	10	50
			Total 100

- Students are permitted to bring into the examination room: pens, pencils, highlighters, erasers, sharpeners and rulers.
- Students are NOT permitted to bring into the examination room: blank sheets of paper and/or correction fluid/tape.
- No calculator is allowed in this examination.

Materials supplied
- Question and answer book of 30 pages
- Detachable insert containing a case study for Section C in the centrefold
- Answer sheet for multiple-choice questions

Instructions
- Detach the insert from the centre of this book during reading time.
- Write your **student number** in the space provided above on this page.
- Check that your **name** and **student number** as printed on your answer sheet for multiple-choice questions are correct, **and** sign your name in the space provided to verify this.
- All written responses must be in English.

At the end of the examination
- Place the answer sheet for multiple-choice questions inside the front cover of this book.
- You may keep the detached insert.

Students are NOT permitted to bring mobile phones and/or any other unauthorised electronic devices into the examination room.

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SECTION A – Multiple-choice questions

Instructions for Section A

Answer **all** questions in pencil on the answer sheet provided for multiple-choice questions.

Choose the response that is **correct** or that **best answers** the question.

A correct answer scores 1; an incorrect answer scores 0.

Marks will **not** be deducted for incorrect answers.

No marks will be given if more than one answer is completed for any question.
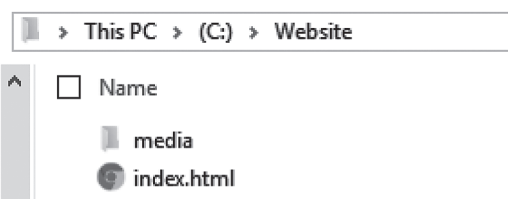
Question 1

An image downloaded from a mobile phone has been manipulated if it has been

A. saved.

B. cropped.

C. deleted from the phone.

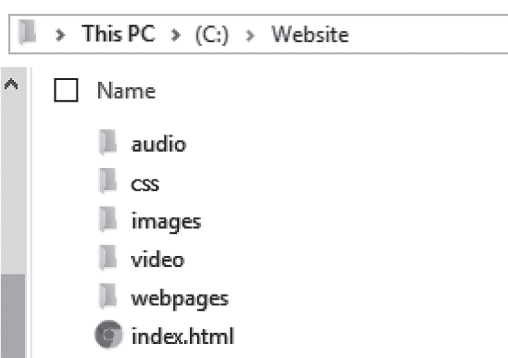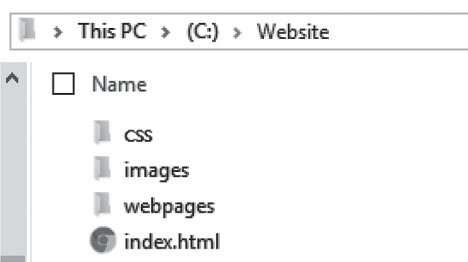**D.** sent to another device via Bluetooth®.

Question 2

Sumina is developing her first multimedia online solution (MMOS). She is finding it difficult to manage her files on the network server. Sumina's MMOS has media files, web pages and Cascading Style Sheet (CSS) files.

Which one of the following is the most appropriate folder structure for Sumina to implement?

A.

> This PC > (C:) > Website

☐ Name

▯ media
🌐 index.html

B.

> This PC > (C:) > Website

☐ Name

🌐 index.html

C.

> This PC > (C:) > Website

☐ Name

▯ audio
▯ css
▯ images
▯ video
▯ webpages
🌐 index.html

D.

> This PC > (C:) > Website

☐ Name

▯ css
▯ images
▯ webpages
🌐 index.html

Question 3

A design principle that influences the functionality of a web page is

A. navigation.

B. alignment of icons.

C. centring of headings.

D. appropriate use of language.

Question 4

Gino is a website developer who enjoys travelling around the world. While he is overseas, Gino has to work. He usually travels with a mobile device that has limited storage space. Gino is thinking of purchasing a WorldCloud account, which provides appropriate cloud computing services for working travellers.

One advantage for Gino of purchasing a WorldCloud account would be that he

A. can now work without the internet.

B. must use only the WorldCloud software.

C. can easily network his desktop to his WorldCloud account.

D. has greater mobility when accessing and storing necessary data.

Question 5

Timeliness refers to the usefulness of data in relation to the

A. age of the data.

B. tools used to measure how old the data is.

C. time of day at which the data was collected.

D. time stamp and date stamp in a file's properties.

Question 6

Helen is deciding which design tool she should use to design calculations.

Which one of the following is the most appropriate design tool for this task?

A. storyboard

B. attribute listing

C. annotated data dictionary

D. input-process-output (IPO) chart

Question 7

Why do organisations state their shipping and returns policies online?

A. decreased access to global markets

B. to inform customers of their rights

C. as a marketing strategy to attract business

D. to ensure that a potential customer is genuine

Question 8

Solution specifications are determined after framing a hypothesis.

Solution specifications include

A. features, functions and techniques.

B. requirements, constraints and scope.

C. features, requirements and constraints.

D. project management concepts and processes.

Question 9

A diagram that represents how users interact with an online solution is

A.   a mock-up.

B.   an IPO chart.

C.   a user flow diagram.

D.   an entity-relationship (ER) diagram.

Question 10

Khalim would like to evaluate the effectiveness of an MMOS that was implemented six months ago. He is particularly concerned about data displayed in the featured charts.

A strategy for addressing a concern with data when evaluating an MMOS would be to

A.   interview users about the cost of the MMOS.

B.   determine the number of users of the MMOS.

C.   measure the time taken to display the charts in the MMOS.

D.   interview users about the accuracy of the charts in the MMOS.

Question 11

Why is it important to name files in a way that describes the content as well as to store them logically in appropriately named folders?

A.   to make sure that file paths are correctly written

B.   to make sure that files can be effectively located by unauthorised users

C.   to make sure that folders are able to be sorted alphabetically for ease of use

D.   to make sure that files are quickly located by authorised users when they are needed

Question 12

Kaylah owns a small business that creates MMOS for organisations. After meeting with a client to discuss their needs, she prepares mock-ups of several different designs and asks the client for feedback. The chosen design is then developed and tested before being uploaded to the client's webserver for publication. Typical users are asked to access the solution and give feedback before the final product is launched.

Which one of the following project management plans best represents this process?

A.

Task no.	Task	Dependencies
1	Discuss needs with client.	
2	Prepare mock-ups of several designs.	Task 1
3	Select preferred design.	Task 2
4	Build MMOS.	Task 3
5	Test MMOS.	Task 4
6	Fix problems.	Task 5
7	Upload MMOS to server.	Task 6
8	Launch MMOS.	Task 7

B.

Task no.	Task	Dependencies
1	Discuss needs with client.	
2	Mock up several designs.	
3	Select preferred design.	milestone
4	Build MMOS.	Task 3
5	Test MMOS.	Task 4
6	Fix problems.	
7	Upload MMOS to server.	milestone
8	Conduct evaluation.	Task 7
9	Launch MMOS.	milestone

C.

Task no.	Task	Dependencies
1	Discuss needs with client.	
2	Mock up design.	
3	Build MMOS.	
4	Test MMOS.	
5	Fix problems.	Task 4
6	Upload MMOS to server.	Tasks 3, 4, 5
7	Formally test MMOS.	Task 7
8	Launch MMOS.	Tasks 4, 5, 6, 7, 8

D.

Task no.	Task	Dependencies
1	Mock up several designs.	
2	Select preferred design.	milestone
3	Build MMOS.	
4	Informal testing of MMOS.	
5	Fix problems.	
6	Upload MMOS to server.	
7	Test MMOS.	
8	Launch MMOS.	milestone

Question 13

Which one of the following field name designs would be the most appropriate for storing student names and addresses in a relational database management system (RDBMS)?

A.   Name (Text), Address (Text)

B.   GivenName (Text), Surname (Text), Address (Text)

C.   GivenName (Text), HouseNumber (Number), StreetName (Number), Suburb (Text)

D.   GivenName (Text), Surname (Text), HouseNumber (Text), StreetName (Text), Suburb (Text)

Question 14

An organisation protects its data by encrypting its communication over the internet.

This kind of protection could be achieved through the use of

A.   internet protocols.

B.   malware blockers.

C.   security protocols.

D.   technical software permissions.

Question 15

Two of the most important design principles to consider for people with disabilities, special needs or colour-blindness are

A.   contrast and accessibility.

B.   accessibility and balance.

C.   contrast and repetition.

D.   balance and repetition.

Question 16

Kimmy is the owner of an online photography business. She had been given photographs by a famous client and was editing them in her local cafe, which provides customers with free unsecured wi-fi. A week later, Kimmy saw that one of the images that she had been editing in the cafe was on the cover of a popular magazine.

The most serious consequence of this security failure for Kimmy and her business could be

A.   the loss of the famous client.

B.   legal prosecution by the famous client.

C.   a decline in the value of her business.

D.   the loss of photo editing secrets to competitors.

Question 17

An announcement will be made by Kang's Breakfast Cereal to reveal a new and exciting children's cereal.

Which of the following are the most age-appropriate characteristics that should be considered in the announcement?

A.   highly detailed diagrams

B.   bright colours and small text

C.   numerous pictures and videos

D.   a nutritional value table and data analysis

Question 18

Which one of the following data types would be the best way to store information about whether or not special diets are required for people on a camping trip?

A.   text

B.   Boolean

C.   numeric

D.   character

Question 19

gShop is a new German supermarket that is trying to enter the Australian market. Its goal is to create a new online experience for customers through the gShop app. Customers will be able to purchase multiple food products from different parts of the world and have them delivered. Inzar has been hired to help build the gShop app.

What data would Inzar need to collect before creating the online experience?

A.   interviews with German customers

B.   gShop's profit statement from 2016

C.   details of food products from different parts of the world

D.   Australian organic food brands with which consumers are familiar

Question 20

Jerri is a graduate with experience in developing, protecting and managing large data sets.

What type of role would suit Jerri's experience if she was working with a team on a digital system for a real estate agent?

A.   database administrator

B.   documentation writer

C.   web developer

D.   system tester

SECTION B – Short-answer questions

Instructions for Section B

Answer **all** questions in the spaces provided.

Question 1 (4 marks)

Abdul is a graphic designer. He is employed by a software development company that creates programs and smartphone apps. He has been given the task of designing icons for searching, deleting and attaching. These icons are to be used in an app.

Abdul has designed the following icons.

Abdul shows his newly designed icons to a friend, Aya. She then shows him the following set of icons that serve the same purpose.

a. Explain the likely impact on users if Abdul's icons were used in one of the company's apps. Make reference to **one** of the icons that Abdul designed. 1 mark

_____

_____

b. Explain what Abdul should have considered **before** designing his icons. 3 marks

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Question 2 (2 marks)

Connie is currently completing her final year of a Master of Data Science. Connie needs to present her research findings in a multimodal online solution (MMOS). She has been told by the course coordinator that several lecturers around the world will view and assess her findings via the MMOS.

Identify **one** characteristic of an effective MMOS and explain how this characteristic would affect any design choices that Connie makes.

_____

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Question 3 (6 marks)

Trinh has been concerned about the local plant life in her neighbourhood, particularly the native trees. She has collected photographs of trees in this area. These photographs span the last 20 years and were each taken one year apart. Each photograph has an accompanying caption that describes the trees, providing information about the tree types, location, maturity and their health. Trinh is concerned about the number of trees that are dying.

a.   Identify one reason why Trinh should code this data and suggest two techniques that Trinh
       could use to code the data.   3 marks

       Reason _____

       Technique 1 _____

       _____

       Technique 2 _____

       _____

b.   Describe how Trinh could manipulate this coded data to identify patterns over the last
       20 years and explain why this would be clearer than showing people the original photographs.   3 marks

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Question 4 (4 marks)

The city of Faraway has many theatre companies for its small population. Each theatre company puts on a number of plays and each play has a number of roles. The Faraway Arts Council has decided to create a database to help actors search for suitable roles. The data tables are shown below.

Theatre company
Name of company
Director
Theatre address

Play
Title
No. of acts
No. of scenes

Role
Name
Lead/Supporting
Age of character

Create an entity-relationship (ER) diagram for the database using Chen notation. Each entity will require a unique identifier.

Question 5 (3 marks)

Karoth is a senior tester for an organisation. He leads a team of three testers. Part of Karoth's job is to create testing tables for his team and other co-workers to use when testing the functionalities of systems.

Karoth is to write **one** test for each of the following actions:

- Action 1 – The contact form correctly opens from the home page.
- Action 2 – When the 'submit' button is clicked on the 'contact' web page, it sends an email to the Human Resources department.

a. Complete the partial testing table below for the two actions given above. 2 marks

	What was tested	**How it was tested**	**Expected result**
Action 1			
Action 2			

b. Karoth has just been given a newly completed, but not yet launched, MMOS for typical users of his organisation's products to test in their own environment.

Identify **one** reason why this type of testing should occur. 1 mark

_____

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Question 6 (4 marks)

Jack owns an online pet clothing and accessories store. Customers sign up as members and are then able to purchase items. Jack collects member data such as purchased items, addresses and banking details during the initial sign-up.

Jack's sister Anika, who is studying law at university, has recently signed up to purchase some items for her cat and has noticed that a privacy policy is not displayed on Jack's website.

a.   Identify **two** reasons why Jack should have a privacy policy clearly displayed on his website.   2 marks

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b.   Suggest **two** statements that Jack might include in the privacy policy for his customers.   2 marks

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Question 7 (3 marks)

An expensive jewellery store with excellent security cameras and alarms with sensors has sales of more than $5 000 000 each year. Because of its state-of-the-art security system, the store owner sees no problem with customer and inventory data being stored on a tablet that is used mainly at the front desk. The store staff find this useful as the tablet can be moved to any of the display counters when needed. They are confident that the tablet cannot be stolen as the sensors will beep, alerting staff that it has been moved outside. There is no password as it would slow staff down when accessing data. Customers are asked to enter their own details and jewellery preferences to save time.

If a customer's friend shops at the store and enters their own details and jewellery preferences into the store's tablet, the customer can access this friend's details, and use these details to select gifts and have them delivered as part of the store's secret gift program.

Explain the issues arising from the way the store manages its secret gift program. Include a reference to **one** of the relevant Australian Privacy Principles, as part of the *Privacy Act 1988*, in your answer.

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Question 8 (4 marks)

Jarman is a statistician who has been hired by the Melbourne Football League to collect various types of statistics during games throughout the football season.

After each game, Jarman saves a file with the game and player data to his external hard drive. He then returns to his office and sends the appropriate data to the coaches of both teams via email. The hard drive is then placed in the office safe until it is needed again.

Jarman has taken on a work experience student, Jade, and she has been assisting Jarman with the collection of data throughout the 2019 season. Jarman has noticed that some game files are missing from the external hard drive or have been modified. He has also been made aware that Jade's father is the coach of the Coburg Cassowaries. When Jarman asks Jade about the files, she admits that she has been modifying files after giving them to her father.

a. Explain how the integrity of the data and information on the external hard drive has been compromised by this unauthorised access. 2 marks

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_____

_____

_____

_____

b. Outline **two** ways that Jarman could have prevented this unauthorised access. 2 marks

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END OF SECTION B
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SECTION C – Case study

> **Instructions for Section C**
>
> Please remove the insert from the centre of this book during reading time.
>
> Use the case study provided in the insert to answer the questions in this section. Answers must apply to the case study.
>
> Answer **all** questions in the spaces provided.

Question 1 (4 marks)

Pranesh and Carolyn need to write a hypothesis to clearly outline what they are trying to find out.

a. Write a hypothesis outlining a prediction that can be tested using the data that Pranesh and Carolyn will collect from the survey. 2 marks

_____

_____

_____

_____

b. Identify two variables that Pranesh and Carolyn need to include when writing their hypothesis. 2 marks

Variable 1 _____

Variable 2 _____

Question 2 (4 marks)

Pranesh and Carolyn agree that, before they begin work, they should plan their project carefully. They work out the tasks that need to be completed, and the durations and dependencies. These are listed in the table below.

Task no.	Task	Duration	Dependencies
1	Design survey.	2 days	
2	Respondents complete survey online.	8 days	Task 1
3	Respondents complete survey in person.	4 days	Task 1
4	Collate results.	1 day	Tasks 2, 3
5	Design data visualisations.	3 days	
6	Create data visualisations.	5 days	Tasks 4, 5
7	Test data visualisations.	1 day	Task 6
8	Fix errors.	1 day	Task 7
9	Launch MMOS.	0 days	Tasks 6, 7, 8

In addition to the tasks, the team must work within the following constraints:

- The earliest the team can start is Monday, 2 December.
- The team will be unable to work on the project on their days off – Saturday and Sunday.
- Thursday, 5 December, is a town holiday, so no staff will be available to contribute in any way on that day.
- The entire project must be completed by Tuesday, 24 December, when the multimodal online solution (MMOS) is due.

Complete the Gantt chart on page 21, including task durations, dependencies and any milestones, taking into account the constraints listed above.

December 2019

Task no.	Task	M 2	T 3	W 4	T 5	F 6	S 7	S 8	M 9	T 10	W 11	T 12	F 13	S 14	S 15	M 16	T 17	W 18	T 19	F 20	S 21	S 22	M 23	T 24	W 25
1	Design survey.																								
2	Respondents complete survey online.																								
3	Respondents complete survey in person.																								
4	Collate results.																								
5	Design data visualisations.																								
6	Create data visualisations.																								
7	Test data visualisations.																								
8	Fix errors.																								
9	Launch MMOS.																								

Question 3 (6 marks)

Carolyn considers the data that will be collected.

a. Complete the table below by giving one example of each type of data that will be collected. Support each example by explaining why it is needed or how it can be used. Use a different example for each response. The first row has been completed as an example. 3 marks

Type of data collected	Example	Explanation
primary data	*interviews with respondents and observations of teeth*	*Interviews allow the dentists to find out how often respondents visit a dentist and what their dental health is like.*
secondary data		
quantitative data		
qualitative data		

b. In order to collect more data, Pranesh suggests mailing surveys to random residents. Carolyn has an old list of residents that has each person's surname, first name and address. The list is eight years old.

Pranesh is concerned about the integrity of the data if this list is used, in particular the addresses of the residents.

Name the characteristic of data integrity that would cause the greatest problems for the dentists if they use this list. Explain why this characteristic is a concern. 3 marks

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SECTION C – continued

Question 4 (6 marks)

Pranesh and Carolyn seek the help of a friend, Christos, who knows how to set up relational database management systems (RDBMS). Christos tells them that it is important to use consistent naming conventions for all elements of the RDBMS. Pranesh and Carolyn are not sure what he means.

a.   Using an example, describe **one** aspect of a naming convention that could be used when naming table fields.   2 marks

_____

_____

_____

_____

b.   When Christos is designing the tables for the database, he realises that he should add validation to improve the reasonableness of the inputted data.

Describe **two** different electronic validation techniques that Christos should consider applying to ensure that the data collected is as useful as possible. In your answer, make reference to the data to be gathered, as mentioned in the case study.   4 marks

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Question 5 (2 marks)

Initially, the dentists discussed whether or not respondents would supply data online as part of the survey.

a. State **one** reason why respondents might supply data online to the dentists. 1 mark

_____

_____

_____

b. Outline **one other** reason why people might supply their personal data online to other organisations (such as shops, for example). 1 mark

_____

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_____

Question 6 (7 marks)

The following is a subset of data that has been gathered after the survey has run for a week.

> Harry Sparrow, 3 Woodpecker St, Ryeston 3601
> Marly Morrow, 114a James Dr, Ryeston 3601
> Lisa Simmons, 1 Peacelily Crt, Ryeston 3601
> Yu Wong, 88 Oxley Ave, Ryeston 3601
> Peta Piper, 5 Glebe Ave, Altown 3602
> Lionel Piper, 5 Glebe Ave, Altown 3602
> John Smith, 114b James Dr, Ryeston 3601

a. Complete the following data dictionary by providing the best choice for each empty cell. 3 marks

Field name	Data type	Description
GivenName	Text	Stores the customer's given name
Surname	Text	Stores the customer's surname
	Text	Stores house number, street name
Town	Text	Stores the town name
Postcode		Stores the postcode of the customer's town
NumFillings		Stores the reported number of fillings the respondent has

b.   Christos learns that, for legal reasons, he must separate the data collected into two different tables. The first table will contain respondents' personal information so that particular respondents can be contacted. The second table will contain respondents' dental and medical information with no personal details.

Currently, the data is in one table, with the 15 field names listed below.

GivenName, Surname, Address, Postcode, PhoneNo, NumFillings, ToothHealth, GenHealth, NumYearlyCheckups, Photo, DateBirth, Age, BrushFrequency, FlossFrequency, NumAches

This table is already in first normal form (1NF).

Normalise the data so that it meets the requirements for third normal form (3NF).   4 marks

Question 7 (10 marks)

Pranesh and Carolyn have analysed the data and concluded that many residents are not aware of the importance of good dental care. They discuss their conclusion with Christos and agree that they should use this data along with the photographic evidence to communicate this message to the residents via the MMOS. They are not sure of the best approach for generating design ideas and want a solution that is easy to use and can be understood quickly by all of the multicultural town's residents, many of whom might not have a strong understanding of English.
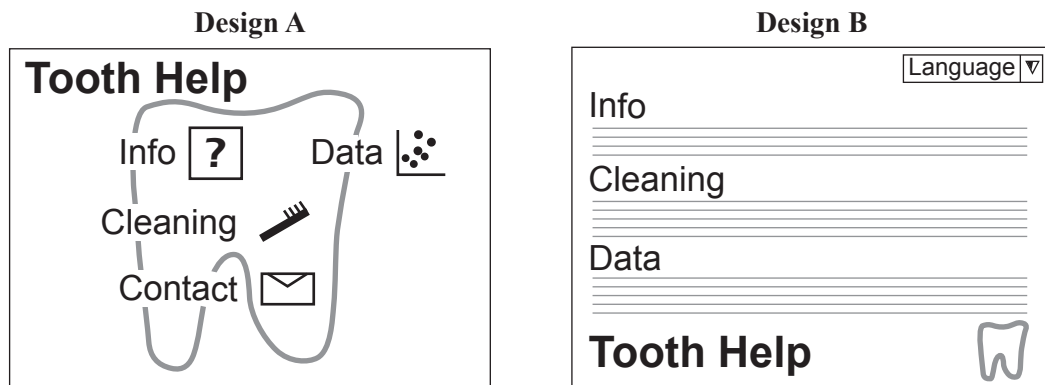
a. Describe and justify **one** technique that could be used to help the team generate some design ideas. 2 marks

b. Explain why the team should spend time discussing their design ideas with some of the residents. 2 marks

c. Christos and the dentists each come up with a design for the MMOS. Their designs, labelled Design A and Design B, are shown below.

Design A

Tooth Help

Info **?**   Data

Cleaning

Contact

Design B

Language ▽

Info

Cleaning

Data

Tooth Help

Using the information provided on page 26, state two effectiveness criteria that could be used to determine which design is more effective for the purpose of educating the community of Ryeston. For each effectiveness criterion, make a judgment as to which design best meets that requirement, comparing it to the other design. Justify your answer.   6 marks

	Effectiveness criterion 1	**Effectiveness criterion 2**
Judgment – Which design best meets requirement?		
Justification		

Question 8 (4 marks)

Christos suggests to Pranesh and Carolyn that they should prepare and implement a disaster recovery plan for the MMOS and the stored data.

a. Identify **one** benefit of preparing a disaster recovery plan.   1 mark

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_____

_____

b. Pranesh has developed the evacuation component of the disaster recovery plan. He asks Carolyn to consult with Christos on the backing-up of data component, as he does not have much experience in this area.
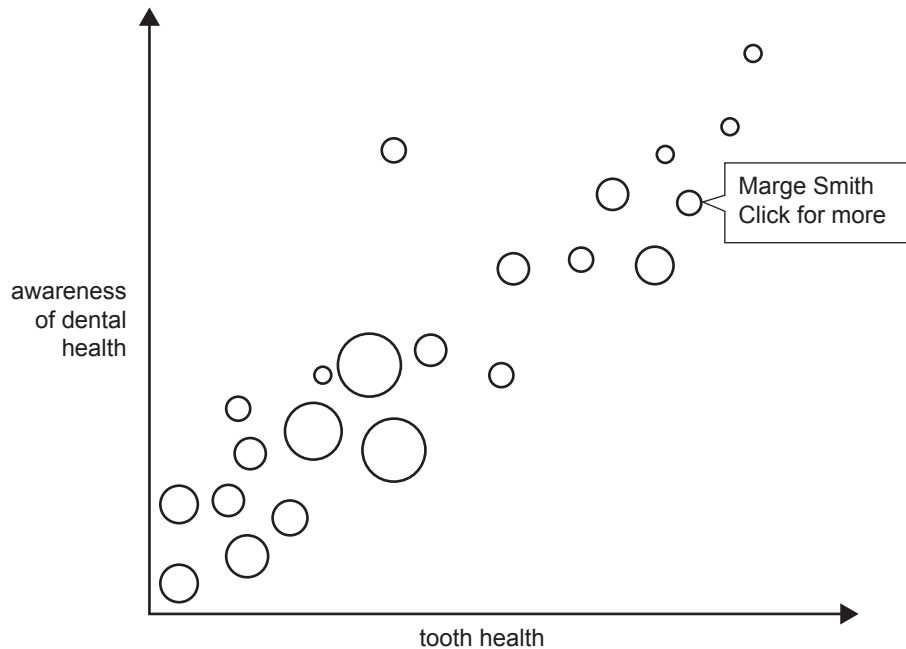
Carolyn thinks that a monthly full backup of their data is sufficient. Christos disagrees and thinks that a weekly full backup and a daily incremental backup is more fitting, especially when it comes to restoring the data after a disaster.

Identify which of the backup plans is more appropriate. Justify your choice of backup plan with reference to how it would benefit the restoration of data after a disaster.   3 marks

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Question 9 (4 marks)

When the MMOS data and the bubble chart were tested, everything worked as expected, but after the MMOS was launched, Pranesh and Carolyn started receiving complaints about people's personal information being available to everybody. They investigated and viewed the bubble chart shown below. When a bubble's 'Click for more' pop-up box is clicked, all of the information collected from the survey is visible, including participants' names and all of their dental and medical information.

a. Identify the legislation that has been breached. 1 mark

_____

b. Explain how this legislation has been breached. 1 mark

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c. Give **two** possible consequences of this breach. 2 marks

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Question 10 (3 marks)

Pranesh and Carolyn decide to work together and set up a new dental practice. They hire new staff and, after a few months, notice that one of their part-time employees, Martha, is not producing the quality of work they expect.

When Martha started, she worked well, but recently she has spent a lot of time either watching videos online or using social media. This has led to bookings being made incorrectly and the information system becoming infected with a computer virus.

Martha takes sick leave and Christos is asked to fix the computer's virus issues during her absence. He notices a series of emails indicating that Martha has been organising accommodation and spa treatments for the same time period. He looks at her social media pictures and realises that she is definitely not sick.

Identify the ethical dilemma that Christos faces and recommend a strategy that Pranesh and Carolyn could use to resolve this issue with Martha.

END OF QUESTION AND ANSWER BOOK

Insert for Section C – Case study

Please remove from the centre of this book during reading time.

Dr Pranesh Silva is a dentist who lives and works in Ryeston, a country town in a remote part of Victoria. The town's population is just over 20 000 people, many of whom have poor dental hygiene. Pranesh assumed that since his dental surgery has fewer than 1000 clients, residents must be visiting the only other dentist in town, Dr Carolyn Wisemann.

Recently, Pranesh and Carolyn met and chatted about the state of the town's dental health. Pranesh was surprised to learn that Carolyn also has fewer than 1000 clients. They realised that since the nearest town and its dentist were more than an hour's drive away, the majority of Ryeston's residents were probably not receiving any professional dental care at all.

Carolyn wondered if the reason that people were not visiting a dentist was a lack of awareness about the importance of good dental hygiene. Pranesh suggested that they survey residents to find out. He believed that addressing this issue might boost client numbers for both businesses. To encourage participation in the survey, they would select a respondent's name at random and offer a free teeth-whitening procedure.

Pranesh and Carolyn designed a survey that would be delivered in two ways:
- online via a website, advertised in the local media and on posters around town
- in person, speaking to people on the streets around town

The dentists and their staff will each carry a tablet computer and enter responses directly into the website as the residents answer their questions.

Pranesh and Carolyn decided to gather data on the following items:
- respondent's name, address and phone number
- how many fillings respondent has
- current health of respondent's teeth (self-assessed for online respondents)
- respondent's general health (self-assessed for online respondents)
- how often respondent sees a dentist
- a photograph of a smile showing respondent's teeth, to measure tooth colour
- respondent's date of birth and age
- how many times a week respondent:
  – brushes their teeth
  – flosses
- how often respondent experiences toothaches

After gathering and analysing their data, it became clear that there were residents who did not know how to care for their own or their families' teeth, so the dentists decided to build a multimodal online solution (MMOS) to explain how to follow dental care routines and practices. As a part of this MMOS, Pranesh and Carolyn created a chart to demonstrate how awareness of dental care and the health of teeth relate to each other. They created a bubble chart like the one shown below, which displays de-identified information about each bubble when it is selected.

END OF INSERT