2022 VCE Applied Computing: Data Analytics external assessment report

General comments

The 2022 VCE Applied Computing: Data Analytics examination was the third year of the VCE Applied Computing 2020–2024 Study Design. The examination consisted of three sections: Section A – Multiple-choice questions, Section B – Short-answer questions and Section C – Case study questions.

In Section A, the multiple-choice questions were mostly answered very well. Areas in which students scored highly related to data sources, data normalisation, data security and data threats. Areas in which students did not score well were scope, queries and characteristics of wireless networks.

In Section B, it was evident that students understood the difference between a backup plan and a restoration plan. Responses were also strong in the area of design tools. Areas for improvement include cleansing data, legislation, using software to develop a dynamic data visualisation and normalisation.

In Section C, students were able to interpret the correct constraints (Question 3) as well as select the correct design based on the evaluation criteria (Question 9a.). However, writing a research question (Question 1) was completed poorly; students need to understand that a research question must start with how, what or why. A large number of students did not relate the research question to the case study. A research question needs to be relevant to the foci in the case study and be researchable. Also completed poorly was identifying the scope that should be included for the infographic; many students were confused and stated the functional requirements instead.

Other areas that should be addressed include:

* When answering a question that asks students to justify the response for three marks, the response must involve a comparison of the stated option against the alternative option and why the stated option is preferred (see Section B, Question 3c.; and Section C, Questions 9a. and 13d.).
* When quoting legislation (see Section B, Question 6; and Section C, Question 13a.), such as one of the acts, students must include the correct year to receive marks for that component of the question (e.g. Privacy and Data Protection Act 2014).
* Students should always give an example that relates to the relevant question or case study or they will not be able to obtain full marks (see Section C, Questions 5b. and 5c.).
* When drawing a Gantt Chart (see Section C, Question 2), students need to start at the end of the last task and go to the start of the next task and through the milestone when drawing the dependences. Marks will not be awarded if the line for the dependencies either starts or finishes in the middle of the task. Milestones need to be on the line (start of the day that the milestone relates to).
* Students need to be familiar with the Applied Computing study design and the software tools and functions document (available on the [Data Analytics study page](https://www.vcaa.vic.edu.au/curriculum/vce/vce-study-designs/appliedcomputing-dataanalytics/Pages/index.aspx)) at the start of each year.

Specific information

Note: student responses reproduced in this report have not been corrected for grammar, spelling or factual information.

This report provides sample answers or an indication of what answers may have included. Unless otherwise stated, these are not intended to be exemplary or complete responses.

The statistics in this report may be subject to rounding, resulting in a total of more or less than 100 per cent.

Section A – Multiple-choice questions

The following table indicates the percentage of students who chose each option. The correct answer is indicated by shading.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Question | Correct answer | % A | % B | % C | % D | Comments |
| 1 | D | 4 | 7 | 25 | **64** |  |
| 2 | B | 2 | **80** | 5 | 13 |  |
| 3 | D | 0 | 4 | 6 | **89** |  |
| 4 | A | **69** | 20 | 7 | 4 |  |
| 5 | A | **75** | 14 | 8 | 3 |  |
| 6 | C | 4 | 30 | **43** | 23 | The question is asking for the top 10 suburbs, so you need to find all the responses first, then sort highest to lowest and filter to 10. C is the only option that does this. |
| 7 | C | 2 | 3 | **81** | 14 |  |
| 8 | A | **84** | 3 | 1 | 12 |  |
| 9 | B | 4 | **39** | 53 | 4 | As the data is required by December 2022 and it is stated that the data will not be ready until late February, then the criterion that is affected is timeliness.There is nothing in the question stem to indicate that they are checking for correctness, so C is not correct. |
| 10 | B | 29 | **64** | 6 | 1 |  |
| 11 | B | 18 | **54** | 5 | 24 | A is a constraint, C is related to non-functional requirements and D is not complete; the answer needs to have both what the solutions will and will not do. |
| 12 | A | **83** | 4 | 6 | 7 |  |
| 13 | B | 3 | **91** | 2 | 3 |  |
| 14 | B | 4 | **66** | 24 | 5 |  |
| 15 | A | **64** | 23 | 3 | 10 |  |
| 16 | C | 3 | 1 | **93** | 3 |  |
| 17 | D | 1 | 0 | 6 | **93** |  |
| 18 | C | 10 | 8 | **74** | 8 |  |
| 19 | C | 5 | 13 | **13** | 68 | A was incorrect because the situation does not need security. B was not correct because implementation is not low cost. D is incorrect because any selected Wi-Fi device could address this issue. |
| 20 | D | 3 | 3 | 1 | **92** |  |

Section B

Question 1a.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Marks | 0 | 1 | 2 | Average |
| % | 38 | 42 | 20 | 0.8 |

Students needed to explain why cleansing is a necessary process. To gain full marks, students needed to mention removing incomplete, inaccurate or irrelevant data as well as explain why this is an important process to complete.

Data cleansing is the process of identifying and correcting errors within a dataset, such as incomplete, inaccurate or irrelevant data points. This is an important aspect of data manipulation and analysis because it helps to ensure that data can be summarised and analysed accurately.

Question 1b.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Marks | 0 | 1 | 2 | Average |
| % | 58 | 16 | 26 | 0.7 |

Suggested responses could include the following:

* Removing blank spaces – This type of cleansing removes extra spaces within text that could affect readability.
Example: Removing extra spaces between words in a cell between first name and last name or between track address with number and street name.
* Editing text to upper or lower case – This type of cleansing improves the readability of text by having the correct case for letters in words.
Example: Ensuring the first letter of the first name, last name, track address with number and street name, etc. all have an uppercase letter and that all other letters are lowercase.
* Spell check – This type of cleansing ensures the correct spelling of names, events and places.
Example: Spell check to ensure events have the correct spelling such as Long Jump, High Jump, etc.
* Find and replace – This type of cleansing is a way to find all the examples of a word or number and replace them with another word or number. It is an efficient way of editing data.
Example: An athlete may have had their name incorrectly spelt when it was first entered. Find and replace would enable the original spelling to be corrected in all instances it was found.
* Filtering fields – This type of cleansing can be used to identify blanks within the dataset quickly, or include/exclude data that meets particular criteria.
Example: Filter a field for blanks and replace with a common placeholder (such as NA or 99:99.99)

Question 2

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Marks | 0 | 1 | 2 | Average |
| % | 35 | 32 | 33 | 1.0 |

Many students only explained what the component does, and did not relate it to the restaurant, resulting in the students not gaining any marks for that component.

Possible explanations of the role of components could include

* Local server:Used to host the restaurant’s point-of-sales (POS) system, as well as any other relevant business documents.
* Cloud server: Used to host the restaurant’sQR-code ordering system.
* Switch: Used to connect the local server to the wireless access points and POS system.
* Wireless access point: Used to provide a wireless connection to the network throughout the restaurant for customers and the kitchen/bar terminals.
* Router: Used to provide a connection to the modem/internet for the restaurant, so that the ordering system can be accessed by customers, staff and the POS system.

Question 3a.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Marks | 0 | 1 | 2 | Average |
| % | 0 | 0 | 100 | 2.0 |

As a result of psychometric analysis, all students were given two marks for this question.

Question 3b.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Marks | 0 | 1 | 2 | 3 | Average |
| % | 65 | 30 | 11 | 2 | 0.6 |

Students were asked to explain how they can use software to develop a dynamic data visualisation.

To obtain marks, students were required to mention that the software needed to be interactive, and that the data needed to be displayed immediately and be related to state, region or suburb.

Many students explained a type of software that could be used to create a dynamic data visualisation, which could not be awarded marks.

Possible responses include the following

Alexis could use dynamic data visualisation software to run filters on her loan, profit and spending datasets in ‘real time’. The data returned could then be passed to pre-set charts and graphs so that the results can be immediately shown. This would allow Alexis’s client to select different criteria and immediately see the graphics change in the visualisation relating to state, region or suburb.

Question 3c.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Marks | 0 | 1 | 2 | 3 | Average |
| % | 24 | 21 | 30 | 24 | 1.6 |

Students who gained full marks selected either the storyboard or the annotated mock-up, and were able to justify why each selection was appropriate and why the other was not appropriate.

If a student selected the annotated mock-up, to gain full marks they needed to describe the annotations of the interactive part of the dynamic data visualisation.

The following is an example of a high-scoring response.

A Storyboard as this allows for Alexis to show how users will interact and navigate the dynamic data visualisations his client requires interactivity; A single annotated mock-up would not be suitable as it can only show one page of the solution when the visualisation could have many pages.

Question 4

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Marks | 0 | 1 | 2 | Average |
| % | 66 | 28 | 5 | 0.4 |

Acceptable responses were:

* All fields in a table relate to a primary key
* No calculated fields
* A primary key in each table

Students who stated that the database had to already be in second normal form could not receive any marks for this statement.

Question 5

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Marks | 0 | 1 | 2 | Average |
| % | 16 | 37 | 47 | 1.3 |

To gain full marks, students needed to provide a definition of a back-up data plan that included reference to regular copying of data and a scheduling plan, and provide a definition of a restoration plan that included a process for how data and information is restored/recovered from back-ups.

Students also gained marks for stating that a back-up plan is completed before a disaster, whereas a restoration plan is completed after a disaster.

The following is an example of a high-scoring response.

Backing up outlines how data is backed you so that ic can be restored if original data is damaged, this includes the location, type, storage media and timing of the backup. Restoration plan outlines the procedures needed to restore the data, as well as the other points such as how power should be restored to a building, back up occurs before a disaster, restoration are following a disaster.

Question 6

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Marks | 0 | 1 | 2 | Average |
| % | 45 | 37 | 18 | 0.8 |

Privacy and Data Protection Act 2014

Victoria Police is a Victorian public sector organisation; as a result, the contractor has obligations under the Privacy and Data Protection Act 2014 and must consider whether the data is being sent securely, and whether the colleague is authorised to view the personal details of vehicle owners that they haven’t collected.

Other acceptable responses included: not for purpose, no consent and not distributed to unauthorised users.

A number of students did not gain full marks as they did not include the year in the act, or got the wording of the Privacy and Data Protection Act 2014 in the incorrect order.

Section C

Question 1

|  |  |  |  |
| --- | --- | --- | --- |
| Marks | 0 | 1 | Average |
| % | 55 | 45 | 0.5 |

To gain one mark, students needed to write a research question that

* was relevant to the foci in the case study
* was researchable (based on the datasets suggested in the case study)
* was clear, without too-narrow a focus (i.e. on one particular set of data)
* started with what, why or how.

The following are examples of suitable research questions:

* What are the main areas of concern associated with public transport?
* What is the impact of current transport use on the future of transport?
* How has the perception of transport changed over the past 10 years?

****Question 2

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Marks | 0 | 1 | 2 | 3 | Average |
| % | 16 | 39 | 34 | 12 | 1.4 |

To gain full marks, students needed to make sure that the milestones were on the line between the two days; several students placed the milestones in the middle of the day and therefore could not gain a mark for that component. Students also needed to make sure that the dependencies went from the completion of the previous task to the start of the next task. Students who did not do this could not gain a mark for the dependencies.

One mark was awarded for each of the following:

* accurate shading of each task
* dependencies shown must have an arrowhead, go from the end of the first task to the start of the next task and go through the milestone
* milestone (milestones must be on the line between days 5 and 6, and days 6 and 7).

Question 3

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Marks | 0 | 1 | 2 | 3 | Average |
| % | 1 | 1 | 1 | 97 | 3.0 |

|  |  |
| --- | --- |
| Constraint | Description |
| legal | Consideration of the ownership of the data used and the privacy of data requirements. |
| economic | Consideration of the cost of the research and the time taken to complete it. |
| usability | Consideration of the usefulness of the infographic to the targeted audience. |

Students had to state the exact words (constraints) that were listed above the table to gain marks.

Question 4

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Marks | 0 | 1 | 2 | Average |
| % | 57 | 23 | 20 | 0.7 |

To gain full marks, students needed to relate their response to the case study, write in full sentences and separate ideas for each, that is, they were not allowed to state:

* include metro area
* not include outside of metro area.

What to include

* The scope of the infographics should include research on all transport network perception issues and perceptions in the Melbourne metropolitan area.
* Also accepted: transport types, transport preferences and metropolitan area.

What not to include:

* The scope of the infographics should not include research on the Victorian transport network outside of Melbourne.
* Also accepted: Personal details, outside of Victoria, data older than 10 years (any date beforehand).

Many students were able to identify what not to include but struggled with examples of what to include.

Question 5a.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Marks | 0 | 1 | 2 | Average |
| % | 31 | 28 | 41 | 1.1 |

Students who gained full marks included an appropriate format and a relevant example.

The following is an example of a high-scoring response.

She could use the DD/MM/YYYY format for displaying the date (day/month/year) such as 23/22/2005 for the 23rd of November 2005

Question 5b.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Marks | 0 | 1 | 2 | Average |
| % | 57 | 24 | 19 | 0.6 |

Most students were able to list the correct technique, but many misread this question and gave an example of what a validation technique is (instead of recommending how she may resolve an issue that arises from having the validation technique in place), and as a result could not gain full marks.

Hong Mei can validate the data by checking that survey respondents have answered all required questions. Her checks would highlight that some questions have been left blank and she would need to decide what to do with those records.

Acceptable validation techniques were existence/required field or range check/list box.

Question 5c.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Marks | 0 | 1 | 2 | Average |
| % | 72 | 16 | 12 | 0.4 |

The only acceptable verification technique was proofreading and checking against the source data (needed to have both parts to gain a mark).

Again, most students were able to list the correct technique, but many students misread this question and gave an example of what a verification technique is (instead of recommending how she may resolve an issue that arises from having the verification technique in place) and as a result, could not gain full marks.

Hong Mei can verify the data by selecting a subset of the data collected and proofreading the answers to make sure it matches the relevant questions. If a response does not match the question it was meant to be answering in a relevant way, she could choose to ignore that particular part of the response.

Question 6

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Marks | 0 | 1 | 2 | 3 | 4 | Average |
| % | 37 | 29 | 22 | 10 | 2 | 1.2 |

To gain full marks, students needed to mention (for one mark each):

* counting responses
* categorising into groups (e.g. bike options or comfort or something similar)
* discussing some form of manipulation (e.g. chart, sort or count)
* relating it specifically to the case study

The following is an example of a high-scoring response.

First, Hong Mei could categorize the data based on keywords e.g. frequent trains, better road quality etc. This could be achieved manually, or by using XLookup in a spreadsheet software to search for relevant key words. Results could then be grouped in category and counted manually to produce quantitative results for the Hong Mei to later analyse and manipulate (by sorting the highest quantity) or graph allowing her to identify patters and relationships.

Question 7a.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Marks | 0 | 1 | 2 | Average |
| % | 30 | 37 | 33 | 1.1 |

To gain full marks, students needed to explain how observations by the students would not be effective and efficient in the situation and provide an explanation of how using the data from the mapping provider’s data portal is highly effective and efficient for the research team.

Common acceptable answers for why student observations would not be effective or efficient are

* lack of completeness (ineffective)
* length of time required to collect sufficient data (inefficient).

Common acceptable answers for why the data portal is highly effective and efficient are

* completeness – more reliable as electronic rather than relying on individuals counting (effective)
* small amount of time required to collect the data for all of Melbourne, saves money as no one to pay (efficiency).

The following is an example of a high-scoring response.

Observing roads takes more time and effort, making it less efficient, furthermore, the accuracy of the observations, is not as high as the data portal due to human error, impacting effectiveness negatively.

Question 7b.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Marks | 0 | 1 | 2 | 3 | 4 | Average |
| % | 45 | 11 | 25 | 4 | 15 | 1.4 |

Techniques that were awarded marks were

* sorting of data
* filtering of data
* conditional formatting
* charts
* calculations.

An example of a response could be as follows:

Technique 1: Tyler could sort the data in descending order, based on the traffic volume field.

Description 1: This would create a ranking of Melbourne’s busiest locations for Tyler to work with and look into further.

Technique 2: Tyler could filter the data by particular values of Time period/Suburb/MetroZone.

Description 2: This would give Tyler a snapshot of what Melbourne’s roads look like at particular times of day / in particular suburbs / in particular zones. This could prompt further investigation.

Question 8

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Marks | 0 | 1 | 2 | 3 | 4 | Average |
| % | 72 | 10 | 9 | 5 | 6 | 0.7 |

The audience characteristics that gained marks were age appropriateness, commonality of language, culture inclusiveness and gender.

Many students confused what an audience characteristic was with the design principles, and as a result did not obtain any marks for their response. A few students used words like ‘age’ or ‘language’, which do not fully describe the characteristic and also could not receive a mark. If students then described the characteristic in relation to the design, they could still receive one mark for their description.

The following are examples of high-scoring responses for each characteristic:

Age appropriateness: Thomas and Hong Mei should ensure all of the infographic can be accessed by all ages. E.g. Big headings and no advances language in text boxes.

Commonality of language: utilizing simple language that a range of audiences can understand will assist in the solution being easily comprehendible.

Culture inclusiveness: The design should ensure that language used is not too complex and can be understood by people from a broad range of education and literacy levels.

Gender: audiences will have people from varying genders, only use gender neutral language in the solution so as to not discriminate against anyone, For example, replace “mankind’ with ‘Humankind’

Question 9a.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Marks | 0 | 1 | 2 | 3 | Average |
| % | 4 | 8 | 53 | 35 | 2.2 |

To gain full marks, students had to select any of the three designs, state why they selected it and then state why the two other designs were not appropriate.

Responses that didn’t justify why the other two designs were not suitable was the reason a large portion of students only gained two marks.

The following is an example of a high-scoring response.

She should have selected design 1. Unlike design 3, design 1 uses alignment (and symmetry) to make the presentation of the information less information dense in specific areas ad unlike design 2 the information is clearly spread out with the relevant subheadings to ensure users understand the purpose behind each graph.

Question 9b.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Marks | 0 | 1 | 2 | 3 | 4 | 5 | Average |
| % | 6 | 6 | 35 | 42 | 6 | 6 | 2.5 |

One mark was awarded for each of the following:

* inclusion of the tile
* depiction of four charts
* text to describe charts and reference data sources
* annotations indicating balance
* annotations indicating alignment.

A large number of students did not include the annotations for balance and alignment and as a result could not be awarded full marks.

Question 10

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Marks | 0 | 1 | 2 | Average |
| % | 46 | 30 | 24 | 0.8 |

Functions that gained marks were any two of:

* creating/selecting a range of shapes
* creating/selecting a range of chart types
* using symbols/images/charts
* the ability to enter, edit and format text and other content
* use of colour/shading.

The following are examples of high-scoring responses for each function.

Shapes: To be able to draw shapes such as boxes and diagrams with a pen tool.

Chart types: Select different types of charts e.g. bar/line or pie that suit the data that is being presented.

Symbols/images/charts: adding/editing graphs to ensure the trends can be clearly identified, and the message communicated in a visual way.

Enter/edit text: adding/editing text to ensure the purpose of the infographic and all elements are clear to the Victorian Government/

Use colour or shading: Use of appropriate colour and shading to make the infographic look like a Victorian Government infographic.

Question 11a.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Marks | 0 | 1 | 2 | 3 | Average |
| % | 52 | 16 | 12 | 19 | 1.0 |

|  |  |  |  |
| --- | --- | --- | --- |
| Test no. | Test data | Expected records returned | Actual records returned |
| X | Records W – Z | Records W and X | Records Y and Z |
| 1 | Records 1 – 4 | Records 2 and 3 | Record 1 |
| 2 | Records 5 – 8 | Records 6, 7 and 8 | Record 5 |
| 3 | Records 9 – 12 | Records 9 and 10 | Record 11 |

Question 11b.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Marks | 0 | 1 | 2 | Average |
| % | 65 | 16 | 19 | 0.6 |

The error is in the query criteria for DayOfWeek (<2 or >6). This means that it is returning weekend information, rather than weekday information.

One mark was awarded for correctly identifying the error in the query and one mark for describing how it leads to incorrect data being extracted.

Question 11c.

|  |  |  |  |
| --- | --- | --- | --- |
| Marks | 0 | 1 | Average |
| % | 88 | 12 | 0.1 |

Possible answers were:

* >= 2 AND <= 6
* >1 AND < 7
* >=2 AND < 7
* >1 AND <= 6
* =2 OR = 3 OR =4 OR =5 OR =6

If stated they were using an Access database, then ‘Between 2 and 6’ was allowed.

Question 12a.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Marks | 0 | 1 | 2 | Average |
| % | 55 | 36 | 9 | 0.6 |

To gain marks, students needed an explanation that the evaluation criteria are developed from the functional and non-functional requirements and an explanation that if the infographics perform well against the evaluation criteria then they will meet requirements.

The following is a sample response.

It is important for Alison to evaluate her infographics solutions by comparing her infographics against the developed evaluation criteria. The evaluation criteria are developed from the functional and non-functional requirements. Therefore, if the infographics perform well against the evaluation criteria, then the infographics meet requirements.

Question 12b.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Marks | 0 | 1 | 2 | Average |
| % | 80 | 13 | 7 | 0.3 |

Considerations included any two of

* timeframe (after bedding down period – need to also mention a time)
* who will participate
* how evaluation will be conducted (e.g. survey, interview)
* how long the evaluation will be conducted for.

The following is an example of a high-scoring response:

How it is going to be evaluated, e.g. will a survey be sent out or will observations be conducted

Timing of the evaluation where time has passed where Alison can consider an evaluation e.g. waiting 3-6 months before evaluating.

Question 12c.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Marks | 0 | 1 | 2 | Average |
| % | 65 | 28 | 8 | 0.5 |

Strategies included:

* comparing the project plan at the start versus the end
* comparing accuracy of time allocated to each task with actual time (could be done via journal)
* checking for completeness – were all tasks added to the project plan?
* interviewing others using the Gantt Chart and asking questions relating to what worked and did not work.

A mark was awarded for each of the following:

* comparing the project plan at the start to the end
* identifying what the tasks and milestone are and if they match.

Most students did not understand the question and either left it blank or wrote one-word answers.

The following is an example of a high-scoring response.

Was the project plan accurate in that it identifies all the key task and milestones of the creation for the infographic. This can be done by comparing what was meant to be completed to what was actually completed and hence determine the accuracy of her project plan.

Question 13a.

|  |  |  |  |
| --- | --- | --- | --- |
| Marks | 0 | 1 | Average |
| % | 83 | 17 | 0.2 |

As the consulting firm is a contractor for the Victorian Government, the legislation is the *Privacy and Data Protection Act 2014*.

A number of students did not gain a mark, as they left the year off or got the wording of the *Privacy and Data Protection Act 2014* incorrect.

Question 13b.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Marks | 0 | 1 | 2 | 3 | Average |
| % | 45 | 44 | 10 | 0.5 | 0.7 |

Under the *Privacy and Data Protection Act 2014*, the company has obligations to investigate the extent of access to the servers and any data breach that may have occurred. They are also required to notify impacted clients of the breach. Not doing so risks reputational damage and potential penalties for the company.

Marks were awarded for any three of the following:

* outline obligation under *Privacy and Data Protection Act 2014* to evaluate extent of data breaches
* outline obligation under *Privacy and Data Protection Act 2014* to notify clients of data breach
* outline obligation under *Privacy and Data Protection Act 2014* to notify authorities of data breach
* indication of consequence for not handling the unauthorized access appropriately.

Question 13c.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Marks | 0 | 1 | 2 | Average |
| % | 27 | 38 | 35 | 1.1 |

Possible actions included:

* multi-factor authentication
* encryption of the data held by the organisation
* improved password practices (not allowing previous passwords, using greater length)
* staff education focused on phishing/spam and not using devices for personal use
* VPN
* limit the capabilities of apps/software on the company device
* firewall
* antivirus/malware.

To gain a mark for the action there needed to be a statement that related to the case study and the security practice; just listing the action was not enough.

Students who suggested the use of biometrics could not gain a mark for that recommendation.

The following are examples of high-scoring responses.

Install some for of encryption on company devices, given some workers use public wifi.

Installing antivirus systems on devices so it is harder for malware to be installed on company laptops.

Martin should implement a firewall on the system, preventing malicious files for entering and exiting.

Add usernames and passwords so that only authorized people access the server and data is not accessed or leaked to prevent overall access to company’s servers.

Question 13d.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Marks | 0 | 1 | 2 | 3 | Average |
| % | 38 | 35 | 21 | 6 | 1.0 |

To gain marks, students needed to justify three relevant points from one of the actions they stated in part c.

Relevant points included:

* loss of goodwill/faith/reputation in the company
* loss of customers
* fines/penalties
* theft of data
* data breach
* legal action.

The following is an example of a high-scoring response.

Installing a firewall to scan incoming and outgoing data packets for the it firms’ network to reject any malicious data packets.

If the firewall was not implemented hackers could steal and leak the company’s sensitive data, which could lead to the business being sued or losing reputation and customers