QATs
Quality Assessment Tasks

NAME: _____

VCE® Computing: Software Development

Unit 3 & 4 Practice written examination

Reading time: 15 minutes
Writing time: 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	5	5	20
C	10	10	60
			TOTAL 100

- Students are permitted to bring into the examination room: pens, pencils, highlighters, erasers, sharpeners, rulers and one scientific calculator.
- Students are NOT permitted to bring into the examination room: blank sheets of paper and/or white out liquid/tape**.**

Materials supplied

- Question and answer book of 17 pages
- Detachable insert at end of booklet.
- Answer sheet for multiple choice questions.

Instructions

- Remove the insert containing the case study during reading time.
- Write your **name** on the space provided above on this page **and** on the answer sheet for multiple-choice questions.
- 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.

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

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

In which phase of the SDLC are evaluation criteria for the whole project developed?

A. Design

B. Analysis

C. Evaluation

D. Development

Question 2

Design tools such as context diagrams and pseudo code are intended to

A. make the design process more systematic.
B. help the client to see progress in the project.
C. document the code that has already been made.
D. give an indication to programmers of what can be done.

Question 3

Software Requirements Specification documents

A. are created in the design phase.
B. show the results of the analysis phase.
C. contain the goals and requirements of the project.
D. are intended to give the designers everything they need to design.

Question 4

Work on coding should commence

A. after the analysis is finished.
B. after all of the design is finished.
C. when the outline of the project is done so that the designers can see what will work.
D. before the user interface is done so that the interface can be designed around the code.

Question 5

When working on a new project, the programmers should

A. test each step as it is written.
B. regularly make copies of all work.
C. follow a version control system to avoid confusion.
D. make sure milestones are used so that development is faster.

Question 6

Naming conventions are used to

A. make it easier to work in large teams.
B. organise programs so that others can read them.
C. provide internal documentation as part of the code.
D. enable non-programmers to be able to understand whether code has followed design.

Question 7

Data types for variables

A. are always set in the development phase.
B. can easily be changed later if it is necessary.
C. depend on the eventual use of the data in the variable.
D. are determined by the characters in the data such as numbers in phone numbers.

Question 8

Internal Documentation in a program

A. makes the compiled file size bigger.
B. is totally ignored when the program is compiled.
C. is often used to justify spending extra time to create good code.
D. is only necessary when the programmers want others to understand their code.

Question 9

Data saved in XML format is

A. more useful because it has format.
B. faster to share because of compression.
C. able to be interpreted by many more programs.
D. can effectively hold records that vary in length because of its tag structure.

Question 10

Searching for an item in a list

A. is better with a linear search on a sorted list.
B. should be done with a binary search if the list is sorted.
C. should be done with a binary search if it only involves ones and zeros.
D. is better with a linear search because there is a chance it will be in the first half of the list.

Question 11

Effectiveness criteria

A. are used in the testing phase of a project.
B. are created in the analysis phase as part of the SRS.
C. are used to determine if time, money or effort have been saved.
D. are written as part of the design phase before coding commences.

Question 12

In pseudo code an assignment symbol (←) is used instead of an equals sign because

A. pseudo code is not meant to look like code.
B. that is the format for internal documentation.
C. it points in the direction where the answer is going.
D. equals (=) in pseudo code means equivalent to each other.

Question 13

An external entity in a context diagram

A. can only be used once.
B. is represented by a circle.
C. is shown by using a labelled rectangle.
D. must have a data flow going in and out.

Question 14

When preparing to perform an evaluation the reviewers

A. should develop the criteria just before the project is installed.
B. need the evaluation criteria and can then answer yes or no to each.
C. develop a strategy (who, what, where, when, why, how) to perform the review.
D. interview everyone who was involved in the project in preparation for writing the report.

Question 15

A positive number needs to be entered into a text box. A good programmer will

A. perform a type check.
B. perform a type check and a data validation.
C. repeat the number in a message box to the user.
D. perform an existence check, type check and a range check.

Question 16

All modern banks now have apps for use on phones and tablets. When the app first opens and the password is entered there seems to be a small hesitation. This is caused by the

A. software being too complex for use on a phone.
B. app exchanging public keys with the bank for encryption of the data.
C. internet at the bank not being quick enough to provide a good user experience.
D. bank computer not responding as quickly as it could because of so many other users.

Question 17

Teri has been asked to modify the user interface on an application to prevent users from being able to enter a date using the keyboard because so many users cannot input a date in the correct format. Teri suggests that users need to enter the date to be able to use the form on the website. Teri further suggests using a calendar picker. Teri's manager loves the idea because

A. many users like calendar pickers.
B. the date will always be a real date.
C. users will be prevented from entering dates from the keyboard.
D. there is no programming because the code is available free on the internet.

Use the following information to answer Questions 18 and 19

Nic is working on a website used for the sale of alcohol which wants to know the year the user was born so that alcohol cannot be sold to a person less than 18 years old. Nic should also test for ages that are not believable – too old to be alive.

Question 18

When writing the code, Nic needs to test the age question. In the year 2022 Nic should use test values of

A. 2021, 2022, 2023
B. 2004, 2005, 2023
C. 2003, 2004, 2005
D. 2004, 2005, 2006

Question 19

Nic realises that a person who is about to turn 18 or has just turned 18 will cause a problem with the code. The simplest way to solve it is to

A. check if the user was born 18 years ago then ask for the month and if they were born in the current month then ask for the day.
B. check if the user was born 18 years ago then refuse service without a proof of age card/licence being scanned and sent.
C. have every user enter their full birth date and check year first then month then day.
D. request users born 18 years ago to purchase all alcohol in a store rather than online.

Question 20

Georgi has been employed to work in the design of a new software project. The first task that Georgi has to work on is a data dictionary. Georgi is given the proposed user interface, the names of the controls, what each data entry box is meant to collect and the pseudo code of one module. To be successful Georgi needs to understand that a data dictionary is

A. a table with all the data in it for that module.
B. a listing of all the data types that will be used in that module.
C. the definition and description of the data types for that module.
D. the table with the variable names, data type for each variable and a description.

SECTION B – Short-answer questions

Instructions for Section B

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

Question 1 (5 marks)

Marta has been assigned to start the analysis for new software for Waste Reducers (WR). WR work as consultants in the recycle industry and have ten people who spend most of the time in the office and some of their time visiting recycling facilities.

a. Suggest **three** ways that Marta can collect data for her analysis. 3 marks

b. From **part a** choose the best data collection method and explain how Marta could collect the data she needs. 2 marks

Question 2 (3 marks)

Ahmed visited his mother recently and discovered that the only copy of most of her photos and videos is on her old computer. Some photos and videos are on her phone but not copied to the computer yet. The photos and videos use 160GB of space on the computer.

Describe a strategy that Ahmed can implement to safeguard the photos and videos.

Question 3 (5 marks)

As part of the design phase for a new project Piotr has to document all of his ideas so that the best can be used. Piotr's manager wants a context diagram and those "other drawing things"

a) Name two "drawing things" which Piotr's manager probably intends for Piotr to make. 2 marks

b) Choose one "drawing thing" from **part a** and explain how it will help Piotr in his design. 3 marks

Question 4 (4 marks)

As part of an employment interview Joni has been given the following pseudocode fragment. Joni has to give the values of all of the variables after the code has "run" through a desk check. Complete the desk check for Joni by filling in the table below.

```
Begin
    num ← 5
    fact ← 2
    changer ← 3
    tots ← 0
    While num < 20
      Tots ← tots + (num x fact)
      num ← num + changer
      fact ← fact + 1
      changer ← changer + 2
    End While
End
```

num	fact	changer	tots

Question 5 (3 marks)

User interfaces are very important for successful software.

Many designers forget to cater for the widest possible audience. For example, hearing impaired people often do not hear audio cues such as beeps when they enter something wrong into a text entry box.

a) What design change could be made to help hearing impaired users? 1 mark

_____

_____

b) People who need glasses and those who are partially colour blind often have difficulties understanding user interfaces.

Describe two changes that can be made to help these people. 2 marks

_____

_____

_____

_____

End of Section B

SECTION C – Case study

Instructions for Section C

Answer **all** questions in the spaces provided. Remove the case study insert and read **all** the information provided before you answer these questions. Answers must apply to the case study.

Question 1 (3 marks)

As part of preparing the quote Peta needs an analysis of the needs of AAACT.

A Software Requirements Specification (SRS) needs to be created. Huynh begins with listing the important parts of the SRS but has not completed it.

Fill in the missing parts:

Purpose and Audience

User characteristics

_____

Functional requirements

_____

Scope

_____

Question 2 (6 marks)

List **two** functional requirements and **explain** why each of them is important.

Question 3 (4 marks)

After the SRS is finished Huynh wants to create a Gantt chart. A list of all of the tasks to be done is needed and some estimate of the time to complete each one.
Peta instead decides to present the SRS to AAACT.

Describe **one advantage** of Peta's decision:

Describe **one disadvantage** of Peta's decision:

Question 4 (4 marks)

Huynh has started on the Gantt chart and notes that making the database can be done at the same time as the GPS trackers are being installed and at the same time as the user interface is being created. However, the GPS tracker details and the trucks on which they are to be installed need a database in which they can be recorded. So, the tracker **details** have to wait.

a) What is the correct terminology for this situation? 1 mark

_____

_____

b) Will the tracker details not being ready impact on the creation of the user interface? Briefly explain. 2 marks

_____

_____

_____

_____

c) Finishing the database will be a significant event. What is the correct terminology for this event? 1 mark

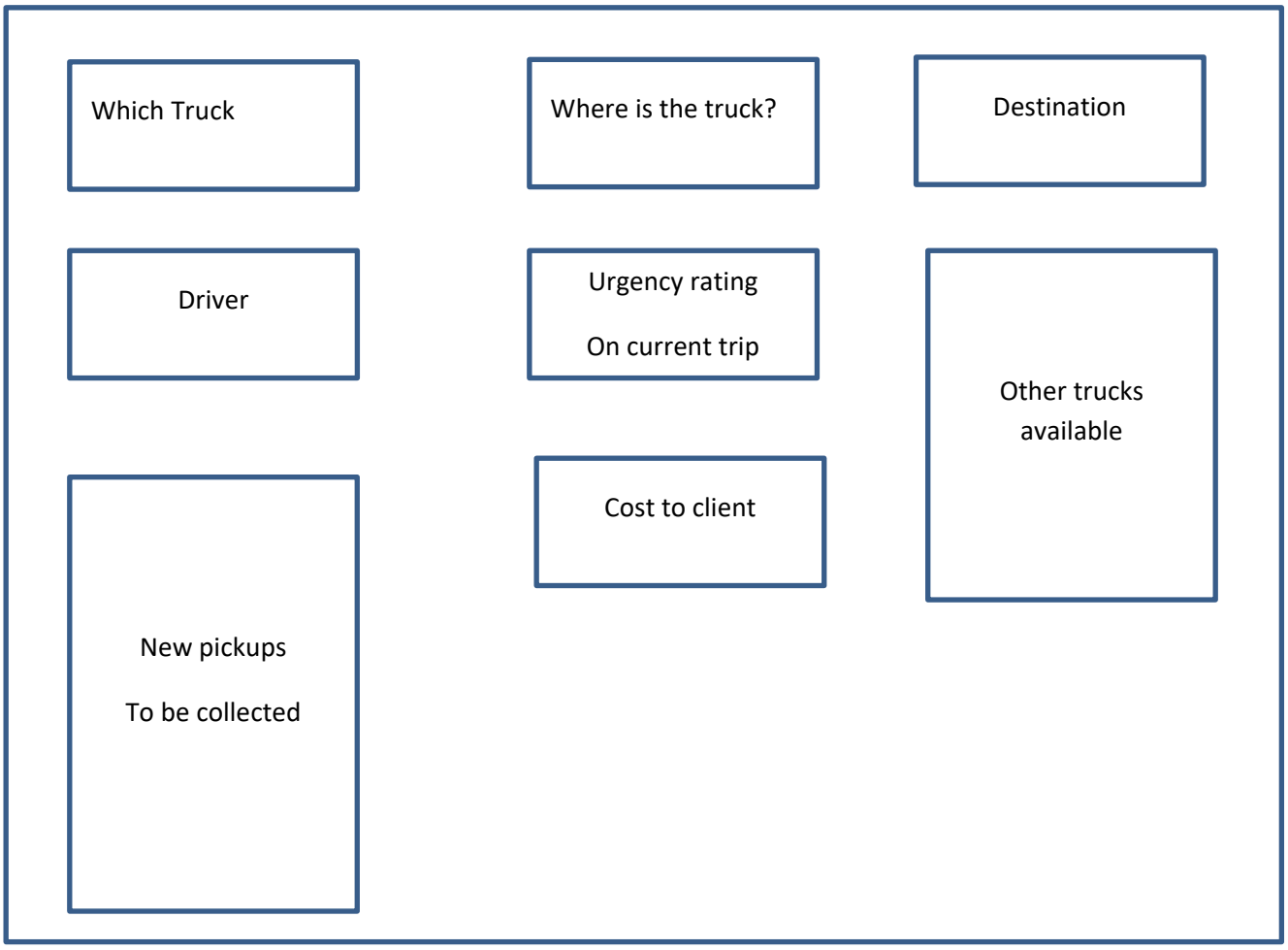
_____

_____

Question 5 (6 marks)

AAATC has told WKA that the quote is too expensive and has asked for less to be done. Huynh has suggested that the User Interface could be made more cheaply.

Huynh has drawn this concept of the display screen:



Choose **two** separate problems with this interface and explain why each is a problem.

Problem 1:

Problem 2:

Question 6 (2 + 3 + 2 + 3 = 10 marks)

Peta wants an input screen as well.

To reduce costs of coding and testing Peta will rely on the experience of the operators and users to only enter acceptable data.

Explain how each of the below validation techniques work and two consequences of not including both of these in the AAACT software:

Type Checking:

How it works:

_____

_____

_____

_____

Consequence of not using:

_____

_____

_____

_____

Range Checking:

How it works:

_____

_____

_____

_____

Consequence of not using:

_____

_____

_____

_____

Question 7 (4 marks)

When Peta presents the initial screen designs to AAACT they are happy with the reduced cost.

The base operators are also called in to give feedback. They are not happy. The major question is "How do we know what each truck is doing?" Peta offers to add that functionality to the interface (for extra cost).

Peta and Huynh write an algorithm that displays all the details about any truck when that truck is selected from the list of trucks. They perform a desk check which finds an error.

Part of the algorithm is below.

Event is triggered when truck name is selected and displays data on display screen

```
Begin      Populate_Displays
  Current_Truck_ID ← Which_Truck_Selected(Truck_ID)
       // this is the ID of the truck selected in the list
  Driver_text ← driver(Current_Truck_ID)
  Destination_text ← destination(Current_Truck_ID)
  Urgency_text ← urgency(Current_Truck_ID)
  Other_trucks_text ← trucks(Current_Truck_ID)
  Where_is_text ← GPS_coords(Current_Truck_ID)
End
```

a) When the operator selects a truck name the boxes populate, except that the Other_trucks_text box shows the wrong data. It does not show a list of available trucks (see display screen and names of boxes).

Explain what is wrong with the algorithm. 2 marks

_____

_____

_____

_____

b) What should happen with the Other_trucks_text box? 2 marks

_____

_____

_____

_____

Question 8 (13 marks)

The base operators at AAATC complain that they cannot assign a truck to make an additional pickup. They can see the availability but cannot actually make the changes.

Peta (at WKA) reminds AAATC that this was a part of the original quote that was rejected and that they can have it at additional cost.

Huynh adds new fields to the database so that:

- a truck can have two destinations.
- the trucks will also have a size indicator so that the operator will be able to see if there is enough space on the truck for the extra load
- a truck can have two levels of urgency

The display interface needs changes.

a) List the text boxes that will need to be added to the display. 3 marks

_____

_____

_____

_____

_____

_____

b) Peta and Huynh write extra pseudocode. The event of clicking on a new pickup in the New_Pickups list causes this code to be run.

They do a desk check which produces errors.

```
Begin      Add_load_to_truck
  Current_Truck_ID ← Which_Truck_Selected(Truck_ID)
       // this is the ID of the truck clicked in the list
  Add_Pickup_ID ← New_Pickups_Selected(Pickup_ID)
  Destination(Current_Truck_ID) ← destination(Add_Pickup_ID)
  Destination_text ← destination(Current_Truck_ID)
  Urgency_text ← urgency(Add_Pickup_ID)
  Extra_Urgency_text ← urgency(Pickup_ID)

End
```

Complete the test table below using the pseudocode and given test data for a truck going to Mordialloc with Low urgency and diverted to Moorabbin for a High urgency pickup to go to Mentone. 3 marks

Data item	Data	Expected result	Desk Check result
Pickup point	Moorabbin	Moorabbin	Not shown
Extra-Destination	Oakleigh	Oakleigh	Not Shown
Destination (Current)	Mordialloc	Mordialloc	
Urgency (Current)	Low	Low	
Extra Urgency	High	High	

c) List any **two** problems in the pseudo-code. 2 marks

_____

_____

_____

_____

d) **Re-write** the two lines of pseudo-code identified in **part c** so that the correct output is produced. 2 marks

_____

_____

_____

_____

e) The test table also shows that there are problems with the display page.
List **three** problems which Peta can fix on the display page. 3 marks

Question 9 (3 marks)

Further usability testing by the base operators shows that when a truck has delivered an item it still shows as being in the truck. Peta adds to the software so that when the truck is at the GPS co-ordinates of the destination the software automatically removes the data about the load from the truck and shows it as available.

There are occasions when a truck arrives and the business is closed or the address is wrong. However, the software now shows the truck as available.

Suggest how this problem can be avoided or fixed.

Question 10 (7 marks)

The new database will need to be backed up frequently. Clients who have not used AAATC for a year will be removed from the main database and delivered pickups will be removed after three months.

All of this data cannot be deleted because of invoicing and tax considerations so needs to be retained for five years.

a) Explain what will need to happen to this data and where it should go. 4 marks

b) Describe three things that the backup system will need to do 3 marks

END OF QUESTION AND ANSWER BOOK

Insert for Section C – Case study

Please remove from this book during reading time.

Case study

Almost Always Available Trucking Company (AAATC) does deliveries in Melbourne and around Victoria. AAATC has a fleet of trucks of various sizes and a large number of clients. When the clients call they want a truck immediately and want their items delivered as soon as possible. Some clients are more flexible about pick up and delivery but still want it all done quickly.

AAATC want to know the location of the trucks at all times and the current destination. This relies on the drivers staying in contact with the base operator and the operator retaining all that information. The trucks can often be diverted to do a pick up while travelling to a delivery location.

WKA (We Know Answers) has been engaged to implement software that will help AAATC function more effectively. WKA cannot find off the shelf software that will work well in the trucking company so they will produce a quote for AAATC to write, test and implement software.

WKA owner (Peta) has employed Huynh to help successfully complete this job.

END OF CASE STUDY INSERT

Section A: Multiple Choice Answer Sheet

NAME: _____

For each multiple-choice question, shade letter of your choice.

Question				
1	A	B	C	D
2	A	B	C	D
3	A	B	C	D
4	A	B	C	D
5	A	B	C	D
6	A	B	C	D
7	A	B	C	D
8	A	B	C	D
9	A	B	C	D
10	A	B	C	D
11	A	B	C	D
12	A	B	C	D
13	A	B	C	D
14	A	B	C	D
15	A	B	C	D
16	A	B	C	D
17	A	B	C	D
18	A	B	C	D
19	A	B	C	D
20	A	B	C	D

QATs
Quality Assessment Tasks

Solution Pathway

NOTE: This task is sold on condition that it is NOT placed on any school network or social media site (such as Facebook, Google Docs, etc.) at any time.

NOT FOR PRIVATE TUTOR USE.

Below are sample answers. Please consider the merit of alternative responses.

SECTION A – Multiple-choice question

Question	Answer	Comments
1	*A*	VCAA mandated
2	*A*	Organisation needs to be systematic
3	*C*	SRS is for designers to use to begin designing
4	*B*	Design finished before development (in waterfall model at least)
5	*B*	Backup all the time
6	*C*	Purely for internal documentation
7	*C*	So a number can be text if no arithmetic is done
8	*B*	Internal documentation is unnecessary for the program to run
9	*D*	The absolutely key thing about XML
10	*B*	Only fully correct
11	*D*	In design (VCAA mandated)
12	*D*	Only fully correct answer
13	*C*	Only full correct statement
14	*C*	Strategy to perform evaluation is important
15	*D*	All need to be done
16	*B*	Banking is encrypted
17	*B*	User desires are irrelevant
18	*C*	Boundary conditions either side of 2004 and younger than 100
19	*C*	Simplest method
20	*D*	Comprehensive – covers all things

SECTION B – Short-answer questions

Students are expected to answer in sentence form rather than dot point (a change from past practice 1991 to 2015 approx.).

Answers here are in dot point to allow marker to see salient points.

All other reasonable answers are acceptable – reference to case study/question stem is very important.

Question 1 (5 marks)

a) *Survey, observation, interviews* (3 marks)
b) *A survey is good because people are not always in the office, so they can do a survey remotely* (1 mark) *and surveys can be analysed from closed and open questions* (1 mark).

Question 2 (3 marks)

strategy – who what when where why how

Ahmed supplies external HDD x 2, sets up auto back up regime (1 mark)

Mum plugs into computer daily and lets it happen

Mum takes one drive with her and one stays at home (1 mark)

Ahmed might also alternate a drive to go with him

All files (photos videos) copied to both drives (1 mark)

Regularly

Ideally, students have six points to get three marks. Realistically many do not understand what a strategy means.

Question 3 (5 marks)

a) *DFD* (1 mark)
Use Case (1 mark)
b) *Use case Piotr can show how functional requirements will be met* (1 mark) *visually* (1 mark) *and also determine how requirements will flow.* (1 mark)

Question 4 (4 marks)

20, 5, 9, 86 (1 mark each) use a trace table.

Question 5 (3 marks)

a) *Colour change the text entry box* (1 mark)
b) *Do not use common colour-blind problem colours – e.g., red, green – next to each other.* (1 mark)
Make text size able to be varied (1 mark)

SECTION C – Case study

Question 1 (3 marks)

Environment (1 mark)
Non-Functional Requirements (1 mark)
Constraints (1 mark)

Question 2 (6 marks)

Truck location needs to be shown (1 mark)

Operator can know whether truck can be diverted (1 mark)

Operator can know how long to delivery (1 mark)

Truck destination needs to be shown (1 mark)

Operator knows how close truck is to delivery (1 mark)

Operator can know if truck can deliver and then do nearby pick up (1 mark)

Question 3 (4 marks)

Advantage: No further work is done if client not happy. (2 marks)

Disadvantage: time is lost while waiting on client decision. (2 marks)

Question 4 (4 marks)

a) *Precedent* (1 mark)
b) *No; the size of the data item is known and so not having the actual data is fine* (1 mark) *also if displayed on map then code to do so can be written using test data to check it* (1 mark).
c) *Milestone* (1 mark)

Question 5 (6 marks)

Problem 1: *usability is low* (1 mark) *no clear flow on screen* (1 mark)*, will require significant practise time to master* (1 mark).

Problem 2: *No buttons,* ***OR*** *no understandable command sequence* (1 mark) – *how does operator choose a truck* (1 mark), *a destination, how does operator add to a truck's load* (1 mark).

Question 6 (10 marks)

Type: checks if data is correct type (1 mark) *e.g., if want a number then is it a number* (1 mark).

Consequences: if wrong data type then program might crash (1 mark) *will lose current data shown on screen* (1 mark) *lose time while restart program* (1 mark).

Range: checks to see if data in allowable range (1 mark) – *e.g. if number : is it positive* (1 mark).

Consequences if GPS location outside Victoria (1 mark) *then truck is lost or stolen* (1 mark) *unnecessary panic* (1 mark).

Question 7 (4 marks)

a) *2nd last line – actually putting in current truck rather than the other trucks* (2 marks)
b) *should be putting in every truck EXCEPT current truck* (2 marks)

Question 8 (13 marks)

a) *Destination-2* (1 mark)*, amount of space used* (1 mark)*, urgency -2* (1 mark).
b) *Mentone* (1 mark)
High (1 mark)
Not Shown (1 mark)

c) any **two** of

destination(current_truck_ID) is loaded with add_pickup_ID (1 mark)
urgency box is loaded with add_pickup_ID (1 mark)
New urgency box is not loaded (1 mark)

d) *destination_2_text* ← `destination(Add_pickup_ID)` (1 mark)
Urgency_2_text ← `urgency(Add_Pickup_ID)` (1 mark)

e) *Urgency_2 is not there* (1 mark)
destination_2 is not there (1 mark)
pickup_point_ID is not there (1 mark)

Question 9 (3 marks)

Do NOT allow software to automatically mark truck as delivered (1 mark)

Instead, must have ability for operator to mark as delivered (2 marks) *[or driver]*

Question 10 (7 marks)

a) *data will be archived* (1 mark) *removed from database* (1 mark)*, moved to a separate database* (1 mark) *preferably on another machine or virtual machine* (1 mark).
b) *copy data to anther drive* (1 mark) *regularly* (1 mark) *e.g., hourly and offsite* (1 mark).