

INSIGHT
Trial Exam Paper

2007

SOFTWARE DEVELOPMENT

Written examination

STUDENT NAME:

QUESTION AND ANSWER BOOK

Reading time: 15 minutes

Writing time: 2 hours

Structure of book

<i>Section</i>	<i>Number of questions</i>	<i>Number of questions to be answered</i>	<i>Number of marks</i>
A	20	20	20
B	7	7	20
C	12	12	60
		Total	100

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

Materials provided

- The question and answer book of 21 pages with a separate case study insert for Section C.
- Answer sheet for multiple choice questions.

Instructions

- Write your **name** in the box provided.
- Remove the case study insert during reading time.
- You must answer the questions in English.

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

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Section A – Multiple-choice questions

Instructions for Section A

Answer **all** questions in pencil on the answer sheet provided.

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

1 mark will be awarded for a correct answer and no marks will be awarded for an incorrect answer.

Marks are **not** deducted for an incorrect answer.

No marks will be awarded if more than one answer is completed for any question.

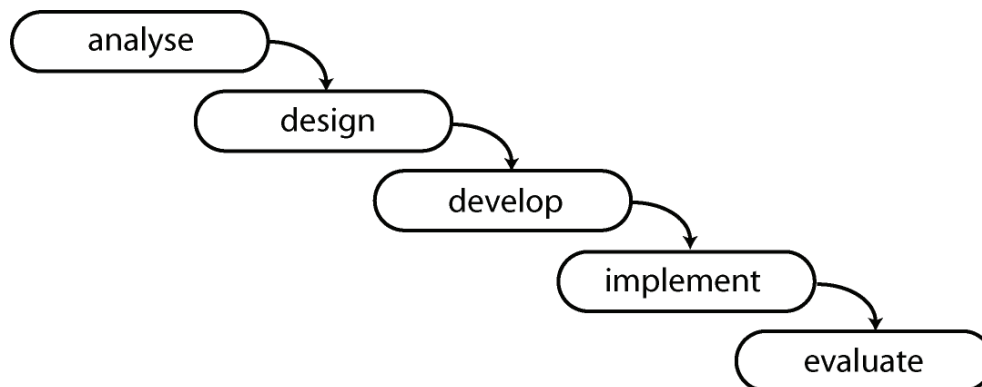
Question 1

A marketing firm uses spreadsheet analysis to determine the best pricing for a new product by posing ‘what-if’ scenarios. What type of information system is the marketing company using?

- A. transaction processing system
- B. management information system
- C. expert system
- D. decision support system

Question 2

The diagram below represents what information systems engineering model?



- A. software development life cycle model
- B. waterfall model
- C. agile model
- D. RAD model

Question 3

Read the following description:

The function of this hardware is to identify and manage data traffic into a network by preventing unwanted data from entering the network, and to control outgoing traffic from a network by stopping unauthorised use of the network from within. This is designed to protect the integrity of the information system.

What hardware is described here?

- A. router
- B. switch
- C. firewall
- D. hub

Question 4

What type of data would be stored in a variable called Total_Cost?

- A. numeric
- B. real
- C. currency
- D. integer

Question 5

In which network topology can only one signal travel along the cable at one time?

- A. bus
- B. ring
- C. star
- D. mesh

Question 6

Bandwidth is

- A. the speed at which data is transmitted over a network.
- B. the amount of data that can be transmitted over a network in a measured time period.
- C. the amount of data that can be transmitted over a network in a session.
- D. the speed at which data can be downloaded.

Question 7

A denial of service attack will

- A. use software to try to uncover passwords and usernames.
- B. install software on a computer without the knowledge of the user.
- C. attempt to overload the system so that it crashes.
- D. find a weakness in the system in order to exploit it.

Question 8

Which combination of modelling tools would you use to show the physical components of an information system?

- A. context diagram and DFD
- B. system flow chart and context diagram
- C. system flow chart and DFD
- D. structure chart and system flow chart

Question 9

Which of the following data acquisition methods will locate secondary data sources?

- A. observation
- B. researching similar systems
- C. surveys
- D. interviews

Question 10

There are seven phases of software development. The diagram below is missing two of them; the missing two are



- A. testing and coding.
- B. documenting and debugging.
- C. testing and documenting.
- D. debugging and coding.

Question 11

Which of the following would not generally be considered to be a characteristic of a high-quality user interface design?

- A. easy to navigate
- B. logical and ordered presentation of information
- C. includes high-level multimedia such as sound and animation
- D. uses complementary colours

Question 12

If I were to evaluate my software on the basis that it was easy to use and therefore allowed for a greater number of transactions to be processed in a given time frame I would be testing for

- A. effectiveness.
- B. usability.
- C. reliability.
- D. efficiency.

Question 13

A program structure that allows for the testing of a condition before different courses of action are executed is a

- A. sequence.
- B. selection.
- C. iteration.
- D. subroutine.

Question 14

A supermarket is looking to update its backup processes. Currently the supermarket's entire server is backed up to a RAID. The supermarket server's capacity is 80 GB, and approximately 10 MB of data is added to the server per day. The supermarket owner wants to invest in cost-effective secondary storage media that can be stored offsite. Which of the following options would best meet the organisation's needs?

- A. DVD-R
- B. CD-R
- C. magnetic tape
- D. CD-RW

Question 15

A touch-screen terminal has been set up by a rural tourist board to support tourism in their area. What is the best form of user documentation for the tourists that will use this technology?

- A. user manual
- B. quick start guide
- C. technical reference manual
- D. procedures manual

Question 16

A programmer, in his role for ABC software, develops a program for Waterworks Plumbing that generates quotes for their business; it will be used by all staff of the plumbing company. Waterworks Plumbing has commissioned ABC Software to produce this software exclusively for them under licence. In this instance, who owns the program?

- A. the ABC Software Programmer
- B. ABC Software
- C. Waterworks Plumbing
- D. the staff of Waterworks Plumbing

Question 17

The e-Robot portal is an e-commerce site that trades in robot toys. Which of the following would not be a benefit of trading over the World Wide Web?

- A. the ability to update information on good, prices and availability immediately
- B. the ability to trade 24 hours a day, 7 days a week in all time zones
- C. the ability to reach a large customer base in a niche market
- D. the ability to avoid dealing with customers face to face

SECTION A – continued
TURN OVER

Question 18

Which element of a disaster recovery plan outlines the processes necessary to get the system up and functioning again?

- A. emergency plan
- B. recovery plan
- C. backup plan
- D. test plan

Question 19

Which of the following factors influencing the acquisition of hardware would be considered a human factor?

- A. training requirements
- B. reliability of suppliers
- C. compatibility of components
- D. reliability of components

Question 20

A university is looking at security measures to protect its data. Which of the following would not be considered to be a software-based security measure?

- A. smart cards
- B. activity logs
- C. usernames and passwords
- D. encryption

Section B – Short-answer questions

Instructions for Section B

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

Question 1

Consider this list of terms relating to networks:

- peer-to-peer
- ring
- LAN
- bus
- client-server
- intranet

For each of the following statements, select the term from the list above which it describes:

- i. This represents a network where all nodes are geographically located together

- ii. This describes a network where each node is equal

- iii. This network is supported by a single cable to which all nodes are connected.

3 marks

Question 2

For each of the following types of threats to data and security, give one example of something that would constitute that type of threat:

deliberate action _____

accidental action _____

technical failure _____

3 marks

SECTION B – continued
TURN OVER

Question 3

Paul is a systems analyst brought in to develop a new information system for a local health club. He needs to collect data on the current system and wants to ensure that he obtains data from a good range of both primary and secondary data sources. Describe the difference between primary and secondary data sources and give an example of each.

4 marks

Question 4

What is the role of internal documentation in a computer program? What should internal documentation include?

2 marks

Question 5

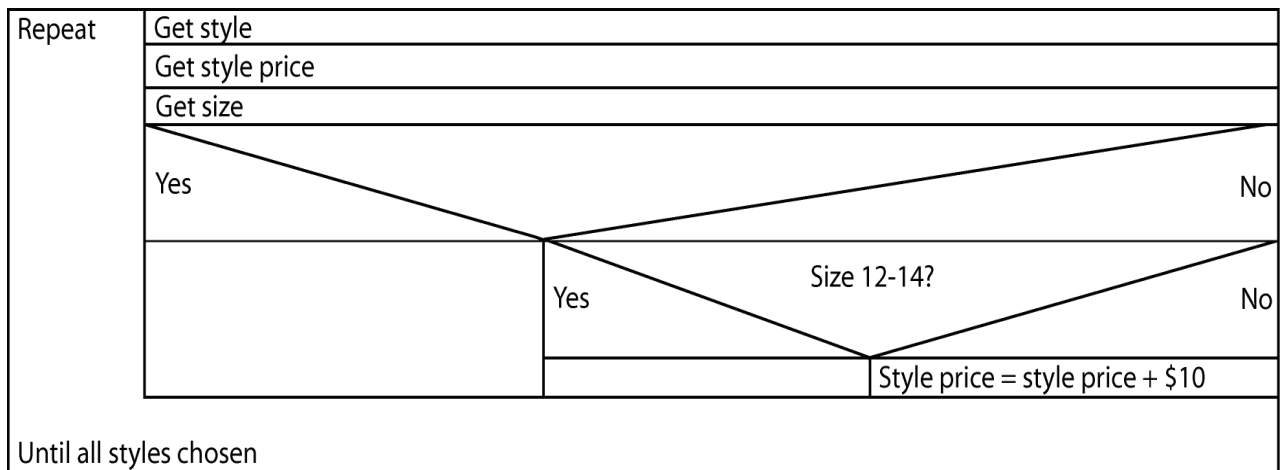
Fancy Pants is an online clothing store that produces custom-made jeans designed to fit a customer’s size. The cost of a pair of custom-made jeans is calculated using the cost of the basic style as a starting point, and then altering the price as follows:

- If the customer is a size 8–10, then take \$10 off style price.
- If the customer is a size 12–14, then the cost of the jeans is the same as the style price.
- If the customer is size 16 or greater, then add \$10 to style price.

The following Nassi-Schneiderman diagram shows the process for calculating the cost of the jeans in the online store. Three items are missing from it.

From the following list choose only three items and write each of the three items in the correct place in the diagram:

- Size < 12
- Style_Price = Style_Price - \$10
- Style_Price = Style_Price * 0.1
- Size 8–10?
- Size >= 16?
- Style Price



3 marks

Question 6

One way that an information system can allow an organisation to operate in a global environment is through a web portal or e-commerce site. Outline three benefits to an organisation of using such a facility.

Benefit 1 _____

Benefit 2 _____

Benefit 3 _____

3 marks

Question 7

Give a definition of the following project management terms:

dependency _____

milestone _____

2 marks

Total = 20 marks

Section C – Case Study

Instructions for Section C

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

Question 1

Some of the concerns that the Warringal Council have about the existing system are listed below. Identify each concern as an economic, social or technical factor prompting change.

Concern	Factor
Two staff members are required to manually enter infringements into the system.	
People are sometimes issued fines for infringements they did not commit.	
The time between an infringement notice being issued and being entered into the system can sometimes be days.	
The current system will sometimes record the same infringements twice.	

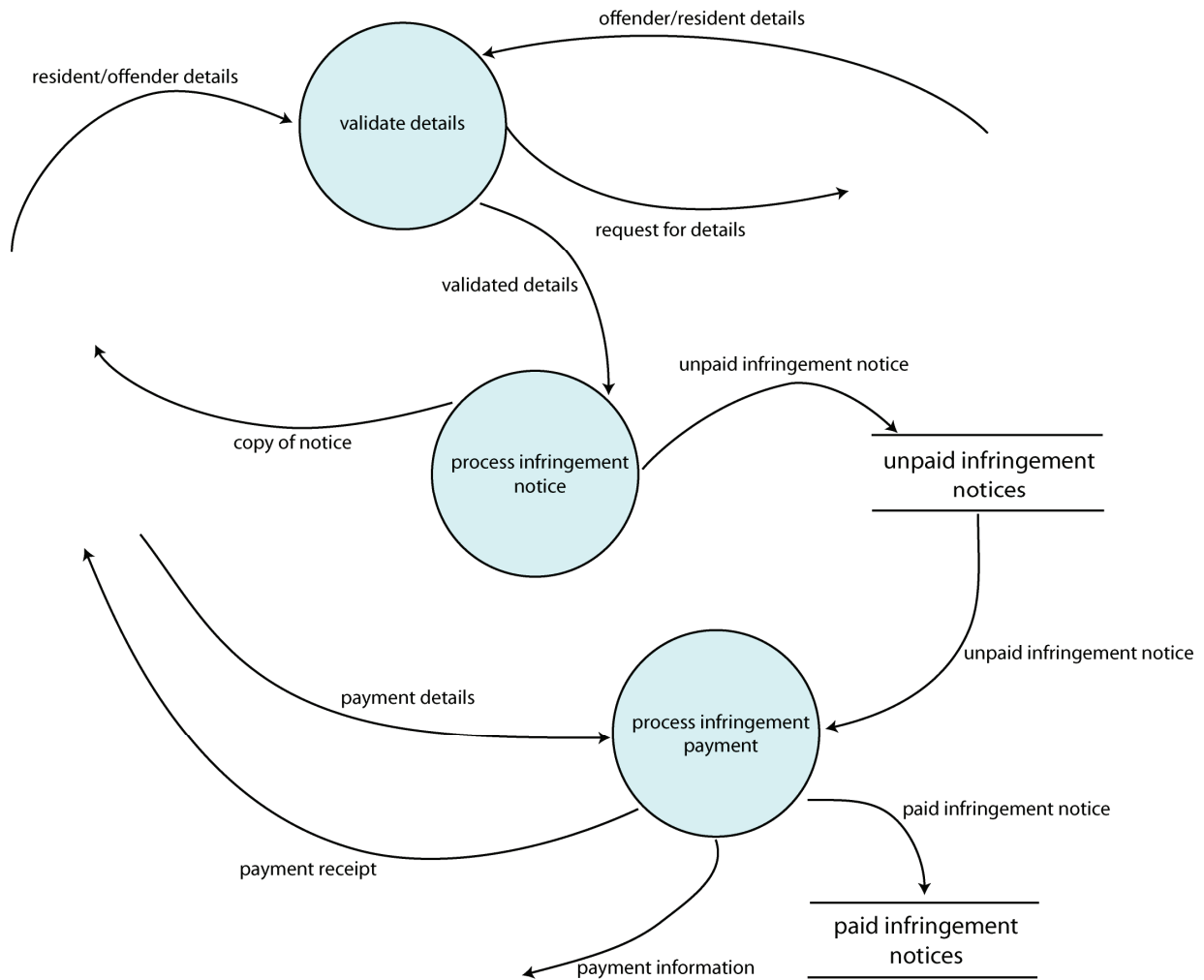
4 marks

**CONTINUED
PLEASE TURN OVER**

**SECTION C – continued
TURN OVER**

Question 2

During the analysis Michael the systems analyst has produced the following DFD to document the processes involved in the current infringement system



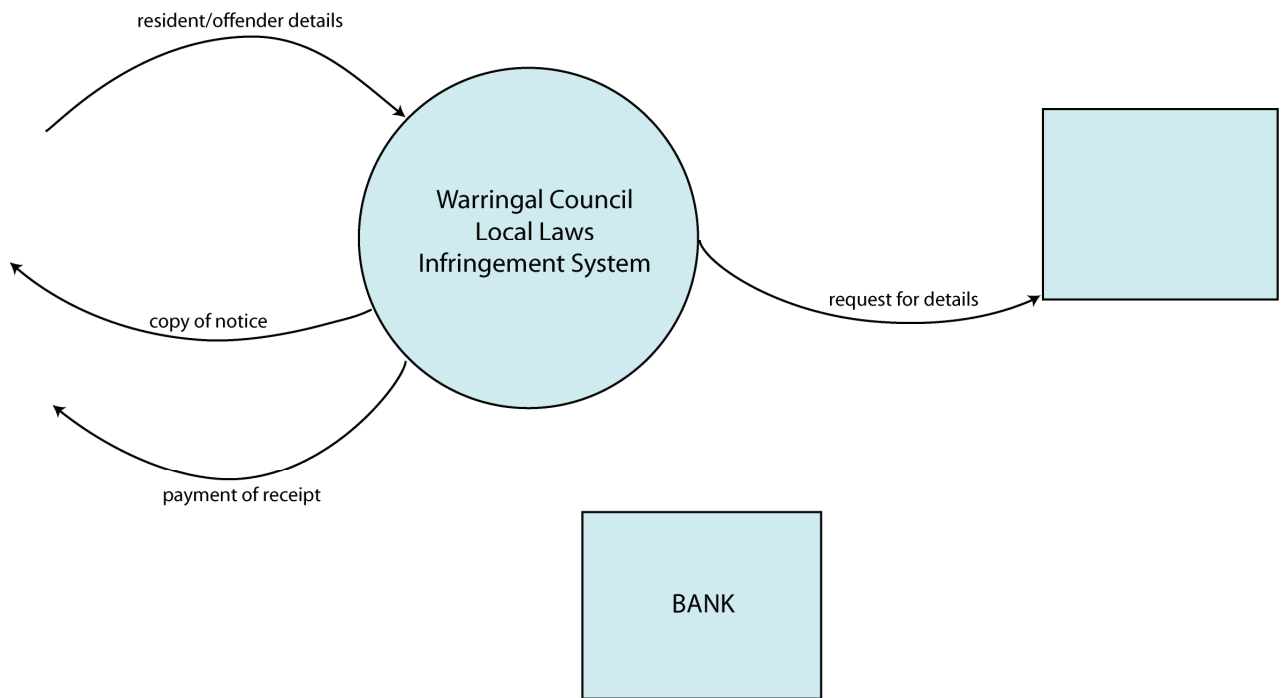
- a. Identify the process that produces the data flow “Payment receipt”.

1 mark

- b. Which element of a DFD does not appear in the diagram above?

1 mark

c. Complete the context diagram for this system.



5 marks

**CONTINUED
PLEASE TURN OVER**

**SECTION C – continued
TURN OVER**

Question 3

Two different brands of handheld computers that meet the requirements of the Warringal council have been sourced from specialty dealers. Both of them have features that allow wireless connectivity, stylus writing and connection to EFTPOS facilities. They have built-in cameras, can function as telephones, and are able to print infringement notices.

Deciding between them is difficult. The specifications are as follows:

Model	Model A	Model B
Processor speed	520 MHz	400 MHz
RAM	64 MB	64 MB
ROM	128 MB	64 MB
Expansions	SDIO	Micro SD
WiFi	802.11b	802.11b
Bluetooth	Yes	Yes
Cellular wireless	GSM/GPRS/WCDMA	GSM/GPRS/EDGE/UMTS/HSDPA
Resolution	480 × 640	240 × 320
Size	13.2 cm × 8.1 cm	11.3cm × 5.8 cm
Battery power	1620 mAh	1350 mAh
Camera	VGA, 1.3 megapixels	VGA, 2 megapixels

The following features would be more useful to officers in the field than some of the others:

- battery life
- screen resolution
- camera quality

Using the table above to make a comparison, and taking into consideration the features listed above, state which of the two models would be best for the Warringal council and justify your choice.

Choice _____

Justification _____

4 marks

SECTION C – continued

Question 4

The Warringal Council has employed a programmer, Samantha, to develop the software that will reside on the handheld computers and interface with the current system at the council offices. Michael the systems analyst has asked Samantha to provide designs for user interfaces to be used in the software.

- a. If a local laws officer is giving an infringement notice to a person who is present, they are required to get that person's signature electronically using a stylus. The screen for doing this appears as follows:

- i. Identify the major fault with this screen.

- ii. Suggest how this fault could be corrected.

1 + 1 = 2 marks

- b. The following screen is shown if a car has outstanding parking fines or has broken another law. Michael believes there is a fault with the screen also.

- i. Identify the major fault with this screen.

- ii. Suggest how this fault could be corrected.

1 + 1 = 2 marks

SECTION C – continued
TURN OVER

Question 5

Samantha has been working on the program and has been having trouble getting one part of it to function. She has been trawling the developer sites on the Internet and found a small shareware program that she is going to incorporate into her program to fix it up. Discuss the potential issues that might arise from this course of action and discuss Samantha's legal and ethical obligations as a programmer.

3 marks

Question 6

When processing parking infringements, the new software will search the infringement notices database to see whether a vehicle has any outstanding fines.

If the vehicle has more than three fines, or has any fine that is greater than 90 days overdue then the system will record this information and calculate an additional fine of \$300 plus 20% of the value of the current fines on top of the one being administered. The officer will then have the vehicle towed.

The following algorithm has been developed to search for and then calculate the fine of a serial offender.

Start

Total_Fine = 0

Get Vehicle_Registration

Get Parking_Violation

Get Fine_Value

Total_Fine = Fine_Value

Search for Vehicle_Registration in infringement notices database

If Vehicle_registration is found in database then

 Get Number_of_Fines, Days_Overdue for Vehicle_Registration from database

 If Number_of_Fines > 3 And Days_Overdue > 90 then

 Total_Fine = Fine_Value + 300 + Fine_Value*0.20

 End If

 Print infringement notice

End If

End

- a. Use the following test data to test the algorithm. Fill in the blank spaces.

Vehicle_Registration	Fine_Value	Match	Number_of_Fines	Days_Overdue	Expected Total_Fine	Actual Total_Fine	Printed?
URE567	\$45.00	No	-	-	\$45.00		
WES846	\$80.00	Yes	3	45			Yes
HAR382	\$45.00	Yes	2	12		\$45.00	
MON383	\$60.00	Yes	4	120	\$372.00		

8 marks

- b. There is a logic error in the algorithm that will cost the Council lost revenue. Identify and correct this error.

2 marks

**SECTION C – continued
TURN OVER**

- c. There is another logic error within the algorithm. Identify that error and explain how to correct it.

2 marks

Question 7

The Warringal Council Local Laws Penalty System will be transmitting some very sensitive and valuable data by wireless means. Privacy laws require that this data be kept secure at all times. Explain one way in which the Warringal Council can ensure that the data they are transmitting with the handhelds is secure.

2 marks

Question 8

The data on the main server of the Warringal Council will need to be backed up regularly to ensure that records of fines and payments are not lost. Brian, the head of Information Technology within the Council, is weighing up the options for doing this.

He has received a quote from a data security company for \$600 per month. For this amount of money, they will complete an incremental backup each evening over the Internet and a full backup each weekend. The data will be stored in secure premises with backups for the last 12 months being kept at any one time.

The other option is for the council to utilize the internal network and perform backups in-house. Incremental backups during the day would be made to a mirrored server with RAID capacity, with full backups to tape being performed at the end of each week.

- a. What would be the advantages and disadvantages of using the outsourced data security company?

2 marks

b. What would be the advantages and disadvantage of doing their own backups?

2 marks

Question 9

The following Gantt chart has been created for the development phase of the project.

ID	Task Name	Start	Finish	Duration	7 Oct 2007							14 Oct 2007							21 Oct 2007												
					8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27							
1	Purchase Handhelds	8/10/2007	8/10/2007	1d	[Gantt bar from 8 Oct to 8 Oct]																										
2	Set up server to interface with handhelds	9/10/2007	9/10/2007	1d	[Gantt bar from 9 Oct to 9 Oct]																										
3	Setup wireless connection between handhelds and server	9/10/2007	9/10/2007	1d	[Gantt bar from 9 Oct to 9 Oct]																										
4	Develop software for handhelds	8/10/2007	19/10/2007	10d	[Gantt bar from 8 Oct to 19 Oct]																										
5	Install software on handhelds	22/10/2007	22/10/2007	1d	[Gantt bar from 22 Oct to 22 Oct]																										
6	Test software on handhelds	22/10/2007	22/10/2007	1d	[Gantt bar from 22 Oct to 22 Oct]																										
7	Test data upload to server from handheld	23/10/2007	24/10/2007	2d	[Gantt bar from 23 Oct to 24 Oct]																										
8	Development completed	25/10/2007	25/10/2007	0d	[Milestone diamond at 25 Oct]																										

a. On what date is a milestone achieved?

1 mark

b. On what dates do concurrent tasks occur?

2 marks

c. How many working days are on the critical path?

1 mark

Question 10

The Warringal Council local laws officers have decided to trial one handheld in the field for a month before all of their local laws officers begin to use them.

- a. What type of changeover method has the Warringal Council decided to use?

1 mark

- b. Provide one other strategy the council could have used to change over to the new system. Explain in detail how the strategy would have worked and why you think it was not chosen.

3 marks

Question 11

Brian has been working with Samantha developing the user documentation and training programs for the local laws officers in the use of the new handheld ticketing devices. Brian thinks that all of the information on how to use the software should be contained within a user guide; Samantha wants to develop an online help option within the program itself.

- a. Describe **one** advantage of having a published user guide.

1 mark

- b. Describe **one** advantage of providing an online help option.

1 mark

- c. What other piece of user documentation would the local laws officers need to assist them with the new system?

1 mark

- d. Suggest a suitable training strategy for the users of the new Infringement Notice software.

5 marks

Question 12

The Warringal Council wants to be able to evaluate the new system once it is operational in the field. For each of the evaluation criteria listed in the table below, identify a piece of data that the council could collect to determine if the criteria are being met.

Evaluation criteria	Evaluation data
Infringements notices are produced in real time	
Time taken to record a fine is halved	
Errors in fines are reduced by 90%	
Equipment is robust and functioning with minimal downtime	

4 marks

END OF QUESTION AND ANSWER BOOK