VICTORIAN CURRICULUM AND ASSESSMENT AUTHORITY

2004 Information Systems GA 3: Written examination

GENERAL COMMENTS

The structure of the 2004 paper was the same as in 2003; Section A comprised of short answer questions and Section B consisted of a case study. The maximum score was 100, with Section A worth 25 marks and Section B worth 75 marks.

As with the 2003 paper, Section A required students to demonstrate core theoretical knowledge. Students appeared to be more familiar with this structure in 2004, and the mean score increased to 16.45. Although this is encouraging, more could be done to prepare students for this style of question. Teachers should endeavour to use a similar questioning format throughout the year, and ensure that students are awarded marks only for complete, accurate responses.

Section B has followed a consistent format for a number of years, and student responses are expected to relate to the case study. This has been stated clearly in previous Assessment Reports and is also indicated on the examination paper. It is disappointing to see that students still regularly lose marks by not relating their answers to the case study. A link to the case study can be shown in a number of ways. When writing about the case study of a large country hospital that was included in the 2004 examination, students should have indicated some analysis and/or evaluation of the case study when answering each question. If this was done, a very clear link was supplied that indicated knowledge of the hospital system; a good example would be, 'Stephen could observe the data entry personnel at the hospital as they enter data' rather then simply, 'observation of system'. Students should be aware that simply stating, 'they', 'he' or 'she' is not a link to the case study as it does not show higher order thinking; students who did this were often unable to gain full marks for the question. When relating to the case study, students should provide a response that clearly shows an understanding of the case study provided; for example, in this case terms such as 'the hospital', 'nurses' and 'the hospital's information system' would be more appropriate the 'they', 'he' or 'she'.

SPECIFIC INFORMATION

Section A

Question 1

Marks	0	1	Average
%	46	54	**0.6**

Students were expected to respond with one stage from the Systems Development Life Cycle (SDLC). 'Implementation' and 'evaluation' were accepted as the most appropriate responses, as changes to a system to correct minor problems can occur in either of these phases.

This question was expected to be an easy opening question, yet only 54% of students gained the mark allocated. Those students who answered 'testing' did not receive any marks as testing is not a stage in the SDLC as indicated in the Information Technology Victorian Certificate of Education Study Design. The stages of the SDLC are: 'analysis', 'design', 'development', 'implementation' and 'evaluation'.

Question 2

Marks	0	1	2	Average
%	26	11	63	**1.4**

In response to part i., technical documentation was a secondary source as it contained data that had been processed. The correct answer to part ii. was primary data, as it was a log of data yet to be processed into meaningful useable information.

Well over half of the students were able to clearly indicate which was a primary source and which was a secondary source; however, as these terms are used throughout the Information Strand of the CSF II and the Information Technology Victorian Certificate of Education Study Design, the percentage should have been much higher. It is important that students and teachers understand that Section A can address any concept mentioned in the Study Design.

Question 3

Marks	0	1	Average
%	7	93	**1.0**

Students were able to answer this question with ease, with 93% of students gaining full marks.

Question 4

Marks	0	1	Average
%	41	59	**0.6**

Acceptable responses included Gantt and PERT charts.

Again, in 2004 it seemed clear that many students were not familiar with project management fundamentals, with only 59% of students able to indicate enough knowledge to gain full marks.

Question 5

Marks	0	1	Average
%	50	50	**0.5**

A clear comment about devices needing to be uniquely identified or else communication would be compromised (for example, less efficient, data collision, inability to communicate with either PC) was required to gain the mark for this question.

The question required students to demonstrate their understanding of IP addresses; however, many students were not able to clearly indicate why having two computers on a LAN would be a problem. It would appear that students need more exposure to questions that ask them to use their knowledge rather than simply recall information.

Question 6

Marks	0	1	2	Average
%	3	20	77	**1.8**

i. 650 Mb CD-ROM
ii. 21 Gb magnetic tape

This question was answered correctly by most students, with well over 90% getting one or two of the storage devices correct. Incorrect responses indicated that some students had little understanding of what capacity would be required for the stated use and were not able to calculate an approximate value.

Question 7

Marks	0	1	Average
%	73	27	**0.3**

A data dictionary contains details of all the data items used throughout the system. It defines each data item with name and meaning and provides details of its attributes – type and structure. It does not show process, entities or data flows.

With over 70% of students receiving a score of zero on this question, it would appear that data dictionaries and their use were not well understood; however, most students did attempt to provide an adequate response. Students needed to show they had an understanding of the use of a data dictionary to obtain the available mark.

Question 8

Marks	0	1	2	Average
%	37	28	35	**1.0**

Acceptable answers included:
a. Product_Cost
b. Total_Cost or Code

Most students were able to get one of the two questions correct; however, it was disappointing to see that only 35% were able to get both the array and the variable correct. As data types and data structures are key elements of both of the programming outcomes in the Study Design, it is a reasonable expectation that students should be able to clearly identify variables of a particular type. Teachers should provide a range of sample questions similar to this in class to help increase students' understanding and confidence with algorithm interpretation.

Question 9

Marks	0	1	2	Average
%	52	13	36	**0.9**

Although there was a similar question on the 2003 exam, over 50% of students were still unable to interpret the Nassi-Schneidermann diagram. Teachers should ensure that students are able to read and interpret flowcharts, pseudocode, and Nassi-Schneidermann algorithmic methods as stated in the Information Technology Victorian Certificate of Education Study Design.

Question 10

Marks	0	1	2	3	Average
%	5	15	19	61	**2.4**

Function	Suggested system software
Provide communication to peripherals	Device driver
Verify user network passwords	Network operating system
Change user's screen saver	Workstation operating system

Over 60% of students were able to match up all three functions with the listed system software. However, a number of students clearly confused workstation operating system and network operating system functions.

Question 11

Marks	0	1	2	3	Average
%	12	13	42	33	**2.0**

This question was relatively straightforward. Students were expected to indicate their understanding of the terms efficiency and effectiveness. Over 85% of students were able to at least indicate that 'plans to measure the time taken to complete a backup' was a measure of efficiency; however, some were unable to fully justify why it was efficiency and not effectiveness.

A response similar to the following would have provided adequate justification, 'Efficiency is a measure of time, cost and effort required to complete a task, whereas effectiveness is a measure of the quality of the task. The time taken to complete the backup clearly deals with a measure of time, so is not evaluating effectiveness.'

Question 12

Marks	0	1	2	3	4	Average
%	3	6	15	46	29	**2.9**

Acceptable answers were:
a. Random Access Memory
b. hard drive
c. wireless network card
d. CDRW

In this question students were expected to demonstrate their technical knowledge by interpreting the advertisement provided. The majority of students did this quite well. Students were asked for the actual component in each question stem, so words such as memory or storage space were not accepted.

Question 13

Marks	0	1	2	Average
%	6	33	61	**1.6**

Possible answers included:
Advantage
- increased market share
- increased profit.

Disadvantage
- language
- money conversion
- security threats – unauthorised users (higher costs).

Most students were able to provide an advantage and a disadvantage. However, a number of students did not focus on the organisational profile provided or on the question stem, which indicated that the answer must relate to the organisation operating a mail-ordering system in a global environment. Some students wrote that the knives were a customs/security threat; even though this is a valid concern, it is not a disadvantage of the organisation's information system operating in a global environment.

Section B

Question 1

Marks	0	1	2	Average
%	41	34	26	**0.9**

Acceptable responses stated a methodology (for example, survey or questionnaire), what it was collecting and who or where the data was coming from (it was this that usually provided the link to the case study). For example, 'Observe the data entry personnel at the hospital and time how long they take to enter data.'

This question asked students to describe how they would acquire the data specified. Students should note that a description requires more than a statement such as 'survey'. A description outlines the features of a particular situation, lists different aspects, and perhaps gives a timeline (when describing a strategy); it requires more detail than a 'list'. Most students were able to provide a general answer but many did not provide a description.

Question 2

Marks	0	1	2	3	4	5	Average
%	27	28	18	17	5	6	**1.6**

The correct answer was 'bus network'. Many students incorrectly suggested 'ring topology'; presumably because the diagram in the case study had the network drawn in a circular fashion, they failed to understand the function of the terminators indicated on the diagram.

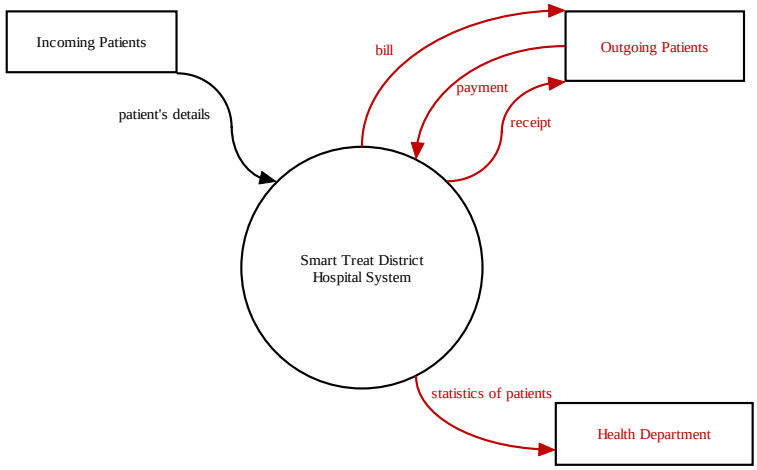
In general, students found it very difficult to provide responses that adequately addressed what was being asked in the question, with nearly 30% receiving no marks for this question. Students did not seem to know the key indicator for identifying network topologies.

In part b, students were asked to provide two advantages of the 'proposed network topology compared with the existing network topology'. Students could not simply discuss the advantage of the new network; their answer had to address the topology. Responses had to show an understanding of the proposed network topology and how this would be an advantage compared to the old bus network. For example, 'A fault in a cable will only disable one particular node and allow the rest of the hospital to function normally, unlike a bus network where a fault would affect the whole network.'

Question 3

Marks	0	1	2	3	4	5	6	Average
%	7	3	6	8	12	10	54	**4.7**

An acceptable response:



In general, students were able to complete the context diagram provided. They were able to pull from the stimulus material the key day flows and entities, with over 75% of students getting four marks or more. It is clear that teachers and students have used past papers and practice exams to perfect their skills in this important analysis and design tool.

Question 4

Marks	0	1	2	3	4	5	6	Average
%	48	23	15	8	4	2	1	**1.1**

This was probably the most poorly answered question on the paper. Students were unable to fully articulate their knowledge in this area, with nearly 50% receiving zero marks out of a possible six. Many students failed to provide any response to this question.

In part a students were asked to explain, in terms of file structure, why it was difficult to add or modify records in the existing serial file. Many students simply wrote a description of sequential file access and did not address the file structure or explain why adding or modifying would be difficult. A possible response could be, 'Serial files do not contain spaces to add new records or modify existing ones, so records have to be added to the end of the file and then the file would need to be rewritten to remain sorted. This would slow the hospital system down.'

In part b, if a response was provided it was generally vague and showed little link to the question. Students were expected to indicate that a random access file has a fixed record size (defined before creation) as this allows data to be accessed quickly. The computer is then able to locate the required record, due to the consistent size indicated, at the start and end of each record.

In part c the question clearly indicated that a link to the case study was required. Many students did not do this and simple wrote why random access files are more efficient than serial files. An appropriate response would be, 'Files can be accessed quicker, so seek time is less which will help the hospital improve efficiency.'

Question 5

Marks	0	1	2	3	4	5	Average
%	9	19	19	19	19	14	**2.6**

In part a students were asked to clearly express their knowledge of data and appropriate data types. A numeric field was unsuitable in this instance as there was an expectation (expressed in the stimulus material) that spaces and brackets would need to be included with each phone number; these are not possible in a numeric field.

In part b students needed to explain why it would be advantageous to have a field of the appropriate length. In this case, a length of no more then 14 would be appropriate as it is more efficient to set the length rather than have allocated space for every phone number set aside that is never used.

In part c students should have used the case study to identify the length as 12 characters.

In part d the most appropriate field types were:

Data to be stored	Field Type
Whether the patient is currently admitted	Boolean
Exact weight in kilograms (for example 72.5)	Numeric – floating point Or Numeric

This information was available in the case study, and students were expected to use the correct IT terminology when responding.

Question 6

a-b

Marks	0	1	2	3	4	5	6	7	Average
%	8	4	5	6	17	16	6	38	**4.8**

c-d

Marks	0	1	2	3	4	5	6	Average
%	29	6	19	8	27	2	8	**2.4**

6a

Data	Expected Results	Actual Results
29.9	Invalid temperature message Data not accepted	Invalid temperature message Data not accepted
30.0	Data accepted – no messages	Invalid temperature message Data not accepted
37.4	Data accepted – no messages	Data accepted – no messages
42.0	Data accepted – no messages	Invalid temperature message Data not accepted
42.1	Invalid temperature message Data not accepted	Invalid temperature message Data not accepted

Question 6a was generally answered well, with students expected to use the examples provided to fill in the blanks on the testing table. Students were still expected to actually test the algorithm with the test data provided; however it was apparent from responses that some students did not do this. Instead, assumptions were made about the expected results, rather than testing the data to find the actual result.

6b

The incorrect line in the algorithm was '**If** Patient_Temp <=30.0 or Patient_Temp>=42.0 **Then**'

Many students were able to identify and write out the incorrect line. The case study indicated that values less than 30.0 or greater than 42.0 degrees would not be accepted.

6c

In part c students needed to identify another part of the algorithm that should be tested. The most obvious was to test if data entered as characters, for example 'thirty', would be rejected. This would be testing the '**If** Patient_Temp is numeric then' clause in the algorithm.

6d

In part d, the majority of students were unable to locate both errors and the subsequent corrections. Many students identified the first correction as '**If** Patient_Temp <30.0 or Patient_Temp>42.0 then' (removing both = signs) and justified it because the temperatures of 30.0 and 42.0 need to be able to be accepted. The second correction was a little more difficult; students needed to state that a line needed to be added after the else statement 'Valid_Temp← False', because if characters are entered for 'Patient_temp', then 'Valid_Temp' stays true.

Question 7

Marks	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**Average**
%	7	10	17	23	19	16	7	**3.1**

Many students did not address this question directly in their three statements. Students were expected to compare the two components listed and provide a link to the case study; for example, when answering why PDAs should be used instead of notebooks, comments about PDAs being cheap and small were not sufficient; there needed to be a link to the fact that they were cheaper and smaller then notebooks and thus easier to carry around the hospital. Only a small number of students were able to provide all elements in their three responses. This is a particularly good question for teachers to use as an example about linking to the case study; something that is so easily forgotten, but in this example also very easy to include to ensure full marks.

Question 8

Marks	**0**	**1**	**2**	**3**	**Average**
%	10	27	38	26	**1.8**

Students generally did well with this question, covering topics such as local versus international locations, reputation, ongoing support, language, relationship established and costs. However, it was disappointing to see that many students automatically assumed that products manufactured in the developing world would be inferior to those developed by a local manufacturer. The response had to relate to the case study and indicate why Medisoft would be better for the hospital.

A possible response could be, 'The Hospital is going to rely on real time data entry, so quick support is going to be an important factor. This may mean more than just easy telephone access. If technical support staff need to fly from the

Philippines, unnecessary delays will occur. In comparison, the local company obviously could be on site within hours. The hospital knows nothing about the reputation of the overseas company or how long they will be in existence, whereas they have used Medisoft before and have developed a good working relationship with them already.'

Question 9

Marks	0	1	2	3	Average
%	43	13	22	22	**1.3**

This question was relatively straightforward, however, over 40% of students received no marks, and only 22% received full marks. Students and teachers should keep in mind that if a question like this is worth three marks then three good points or sentences should be given in the answer. In this case, responses needed to indicate that encryption would be required, how this would be done and to provide a link to the case study.

A possible response could have been, 'Install encryption software on the server and the PDAs. Data can then only be read if using matching encryption keys at both ends. This ensures that the data is kept private and only viewed by those that have the encryption keys. Unauthorised personnel gaining access to the data during transmission will not be able to decipher it, ensuring that all patient details are kept secure.'

Question 10

Marks	0	1	2	3	4	Average
%	14	20	44	13	9	**1.9**

Possible responses include:

Technical Problem	Preventative actions
Too much web surfing may affect the transmission bandwidth	Limit Internet access for hospital staff
Internet access allows access to viruses and trojans	Install antivirus software on each hospital PC
Internet access allows access for spy ware	Install a firewall on the hospital system
Users may install a great deal of unauthorised software	Require separate passwords to install software and only allow some users access if they need to for hospital work purposes.

Students were expected to give two technical problems and appropriate preventative actions. It was also expected that within each response there would be a link to the case study.

A number of students identified non-technical problems, which were incorrect.

Question 11

Marks	0	1	2	3	Average
%	8	7	21	64	**2.4**

The majority of students were able to describe three strategies that could be employed by the staff to ensure appropriate passwords were used, with over 60% gaining full marks for this question.

Question 12

Marks	0	1	2	3	4	Average
%	8	28	43	11	10	**1.9**

In part a students needed address the speed of the transmission and what effect this would have on the hospital. Again this question clearly required students to relate their response to the case study. A possible response could be, 'The transmission rates of the modem would result in a transmission time of about one day each week, which is unacceptable for both the hospital and the government, and the chance of a transmission failure is increased.'

In part b the most obvious response would be to discuss the introduction of satellite transmission and include a clear link as to why this option would be suitable for the hospital.

Question 13

Marks	0	1	2	3	Average
%	11	35	36	18	**1.6**

Generally students did well with this question, with many commenting on aspects such as:

- it's wrong to include hidden access that the hospital is unaware of
- concern about losing his contract
- concern about the privacy of patient details
- concern about the possible loss of funding and data for research if the software is not developed.

Again, this question was worth three marks, therefore students should clearly address three concerns and link them to the case study.

Question 14

Marks	0	1	2	3	4	Average
%	17	8	25	18	32	**2.4**

In this question students needed to select two concerns about the old system from the list provided then explain how the new system would overcome these concerns. Students needed to provide some detail about what would change and how this would happen, as well as ensuring that their responses linked to the case study.

A possible response for the concern regarding the 'time taken before access to both new patient data and archived patient data is available', could be, 'The new system now has all data stored in the hospital patient database and is entered in real time, not batched, so all patient data will be able to be accessed immediately. The archived files are no longer stored in another building but will be part of the patient database; therefore they will be able to be accessed easily by nurses and other hospital staff.'

Question 15

Marks	0	1	2	Average
%	56	23	21	**0.7**

This question was particularly poorly answered, with over 50% of students getting no marks. The question asked students to 'Describe **one** further test that Stephen should perform'. It would appear that many students misread this, as a common response was simply, 'he could test it'. Students should have described a test that could have been performed, and how this would be carried out to test the data transfer between the PDA and the system.

For example, 'Data could be uploaded from the PDA to the hospital system and comparison could then occur between the original data and the system data to ensure data was uploaded accurately.'

Question 16

Marks	0	1	2	3	4	5	6	Average
%	3	1	3	9	17	25	41	**4.8**

Possible responses included:

Group of users	User Doc	Reason
Nurses	PDA users guide	Although they may need to use other equipment, the PDAs will be used by nurses constantly while on duty.
Hospital computer help desk staff	Computer operator guide **or** PDA users guide **or** Data entry manual	Help desk staff will need to help both the nurses and the data entry personnel.
Patient admissions staff	Data entry manual **or** Computer operator guide	Admissions staff will need to know how to use their computer as well as understand how to enter the data.

Responses to this question were generally very well done. Most students received at least four out of six marks, with over 40% getting full marks.