2008 HSC Notes from
the Marking Centre
Information Processes and Technology

Contents

2008 HSC NOTES FROM THE MARKING CENTRE INFORMATION PROCESSES AND TECHNOLOGY

Introduction

This document has been produced for the teachers and candidates of the Stage 6 course in Information Processes and Technology. It contains comments on candidate responses to the 2008 Higher School Certificate examination, indicating the quality of the responses and highlighting their relative strengths and weaknesses.

This document should be read along with the relevant syllabus, the 2008 Higher School Certificate examination, the marking guidelines and other support documents which have been developed by the Board of Studies to assist in the teaching and learning of Information Processes and Technology.

Candidates need to be familiar with the Board's Glossary of Key Words (www.boardofstudies.nsw.edu.au/syllabus_hsc/glossary_keywords.html) which contains some terms commonly used in examination questions. However, candidates should also be aware that not all questions will start with or contain one of the key words from the glossary. Questions such as 'how?', 'why?' or 'to what extent?' may be asked or verbs may be used which are not included in the glossary, such as 'design', 'translate' or 'list'.

Candidates are reminded that the mark value allocated for each question part, along with the 'key words' used in each question part, indicate the type of response required and the depth of that response.

Section I

Question	Correct response
1	A
2	D
3	A
4	D
5	A
6	B
7	B
8	C
9	D
10	B

Question	Correct response
11	C
12	D
13	D
14	C
15	C
16	A
17	C
18	C
19	B
20	B

Section II

Question 21

(a) Better responses identified the process, entity and data transfers. These responses also clearly labelled each aspect of the context diagram.

Mid-range responses identified entities and a process. Many of these responses made no reference to the transfer of data but referred to data store and unrelated entities.

In weaker responses, candidates confused context diagrams with data flow diagrams, system flow charts and in some circumstances provided a diagrammatic representation of the given information system.

(b) Better responses justified the choice of data type for the Owner_Telephone_Number (text) and Paid (Boolean) fields by providing characteristics as well as a justification for their inclusion. Mid-range responses provided characteristics of the data types only.

In weaker responses, candidates attempted to resolve an incorrectly identified error in the data dictionary, stating that number and currency were a better choice of data type, or they restated parts of the question.

(c) Better responses provided multi-table solutions. The candidates clearly identified entities, appropriate attributes as well as identifying key fields and relationship types. These responses explained the cause and effect of utilising a relational database.

Mid-range responses supplied a schematic diagram with appropriate entities and attributes and identified the relationships between the tables.

In weaker responses, candidates provided a flat file solution with no explanation.

Question 22

(a) Better responses outlined a plan for training staff in the use of the NoTruancy system that incorporated the information the staff would need to know in order to run this system, how the staff would be trained and the most appropriate time to commence this training in relation to the system development cycle.

Mid-range responses provided information on how the staff would be trained and/or when training would take place.

Some candidates did not clearly differentiate between all the components of the question and thus only provided the data/information required for the NoTruancy system and/or paraphrased the diagram from the question.

(b)   Better responses provided a clear understanding of the tasks of the network administrator and the roles they would undertake within the NoTruancy system.

Mid-range responses provided a description of the tasks of the network administrator with no relationship to the scenario.

Weaker responses rephrased the processes involved in the development of the NoTruancy system with limited or no understanding of the network administrator's role.

(c)   Better responses provided clear characteristics and features of the issues relating to data integrity and the use of the messaging system in the scenario.

Mid-range responses provided some relevant issues and/or features addressing either data integrity or the use of the messaging system.

Weaker responses were unable to provide an accurate interpretation of data integrity, often confusing it with data validation.

Question 23

(a)   Better responses provided a clear understanding of characteristics and features of two or more techniques that could be used to determine the requirements of the group such as questionnaires, surveys, or interviews along with a description of how the data is collected and how it can be used to inform the designers as to the requirements and specifications.

Mid-range responses provided an understanding of characteristics and features of at least one technique related to the scenario or provided characteristics and features of two or more techniques.

Weaker responses showed a limited understanding by simply naming two techniques or by providing characteristics and features of one technique not related to the scenario. Some responses confused techniques with skills that are part of a technique, for example identifying conflict resolution or active listening as techniques rather than as skills used in the technique of interviewing.

(b)   Better responses made a reasonable judgement regarding the screen design, making reference to most of the original objectives from requirements detailed in the stimulus material including the uploading of photographs and video, the apparent inability to share or display uploaded media, lack of security, messaging capabilities and reference to elements of the screen layout such as tab placement.

Mid-range responses were often less detailed or omitted one or more of the original objectives such as security or messaging.

Weaker responses demonstrated a limited understanding by making a superficial judgement regarding the screen design or by making reference to only one of the original objectives such as the ability to upload photos and video. Some responses made assumptions about what the other pages contained rather than addressing the issues specific to the page presented in the stimulus or by restating segments of the stimulus, for example 'ability to share photos'.

(c)   Better responses provided a fully detailed discussion of all three issues while others provided points for and/or against at least two of these issues.

Mid-range responses demonstrated a clear understanding of at least one issue and addressed at least one other issue or demonstrated a limited understanding of all three issues.

Weaker responses demonstrated a limited understanding of at least one issue and some merely identified one point for or against one issue. Some responses were confused as they discussed various aspects of the three issues, for example privacy or ownership and control described in terms of access. Some responses did not fully address the privacy principles, but rather answered in terms of how privacy is protected, which is more of an access issue than a privacy principle. Candidates are reminded that discussions about access need not be restricted to the use of passwords, but can also encompass an individual's ability to use an information system, based on computer-literacy, disability or socioeconomic considerations.

Question 24

(a)   Better responses demonstrated detailed knowledge of communication media. Better responses also demonstrated knowledge of satellite technology by comparing the viability of laying cables over long distances.

Mid-range responses often discussed the strengths of wireless and/or the weaknesses of cabling the forest, neglecting to clearly indicate both strengths and weaknesses of wireless technology. Mid-range responses were often unable to clearly show why the use of satellite technology may or may not be a viable option.

Weaker responses focused on the inappropriateness of cables in trees or the danger to animals of chewing through the cables, rather than explaining why wireless technology may be a good proposition. Some responses also created a 'journey' of the data from possum box to national database and, although it showed clear understanding of the scenario, this type of response often failed to connect to the question by providing strengths and weakness or comparisons between the types of media.

(b)   Better responses made implications about providing the public, including the hunters and the poachers, with data that may have previously been difficult to obtain. Better responses also explained that scientists, having more data and new types of data such as photographs, would have more work to do with analysis of the data and that they could be situated anywhere in the world as the data is available electronically.

Mid-range responses often discussed the role of the ranger, usually in terms of reskilling, deskilling and redundancy, while only making some reference to the other two issues in the question.

Weaker responses identified that the ranger had less work to do, but could not draw implications from the point/s that they had made. Some candidates also confused the changing nature of work with the natural environment that was provided in the scenario and hence commented on the effect of weather on the system. Many of these responses could not identify any points regarding the greater access of data to the public and even fewer were able to make a reasonable implication of having access to this data.

Section III

Candidates were required to answer TWO questions only from this section. A number of candidates attempted more than two questions. Candidates should be discouraged from attempting more than two questions, as the time they waste on the extra question/s could be better spent fully answering the two questions required.

Question 25 – Transaction processing systems

(a) (i) Better responses explained clearly why transaction processing systems are easily computerised and provided a relevant example to support their explanation.

Mid-range responses provided some reasons why transaction processing systems are easily computerised or provided a relevant response with some reference to transaction processing systems being easily computerised.

Some candidates misinterpreted the question which led to responses regarding why transaction processing systems should be computerised, rather than why they are easily computerised.

(ii) Better responses provided a wide range of relevant data/information recorded by a transaction processing system used to reserve concert tickets.

Mid-range responses provided a narrower range of data or concentrated on one aspect such as customers' personal details without mentioning transaction, venue or price data/information.

Some weaker responses did not provide relevant data/information that could be recorded by a transaction processing system used to reserve concert tickets.

(b) (i) Better responses demonstrated a clear understanding of real-time and batch processing with relevant examples from the self-checkout system.

Mid-range responses distinguished between real-time and batch processing, however they only provided examples for either batch or real-time processing with reference to self-checkout system.

Some weaker responses included a misunderstanding between real-time and batch transaction processing within the self-checkout system. Some weaker responses provided examples that were not relevant to the self-checkout system.

(ii) Better responses discussed the impact that the self-checkout system will have on customers based on all three of the listed aspects.

Mid-range responses demonstrated a limited understanding of the impact of the self-checkout system by only discussing one aspect or by identifying basic aspects of all three issues.

Some weaker responses covered only one or two of the three aspects of the self-checkout system or did not refer its impact on the customer.

(c) In the best responses, candidates demonstrated a clear understanding of the system by identifying the data/information requirements for the listed information processes and identified a relationship between them.

Mid-range responses identified data/information requirements of the self-checkout system for most of the processes without, however, discussing any relationship between the information processes.

Weaker responses did not cover all listed information processes or misunderstood the definition of the information process of analysing.

Candidates are reminded that examples need to be given that relate to transaction processing systems and in particular to the scenario given.

Question 26 – Decision support systems

(a) (i) Better responses clearly defined *data mining* and provided a relevant example.

Mid-range responses provided either a basic definition or a relevant example.

Weaker responses identified a feature of data mining with some relevance to the question.

(ii) Better responses described at least two tasks performed by a knowledge engineer in the creation of an expert system.

Mid-range responses included a description of one task or identification of two tasks performed by a knowledge engineer.

Weaker responses only identified a task performed by a knowledge engineer, though some went further by adding a limited description of a task carried out by the knowledge engineer.

(b)   (i)   Better responses designed formulae for both E4 and G4 that were essentially correct and allowed for the formula for G4 to be filled down.

Mid-range results provided formulae for both E4 and G4 that were essentially correct but contained some minor errors.

Weaker responses designed formulae for E4 and/or G4 that demonstrated some of the key features required. The structure of their formulae did not conform to the rules associated with formula design.

(ii)   Better responses discussed a variety of impacts on the individual.

Mid-range responses discussed one impact with some detail.

Weaker responses either demonstrated a limited understanding or simply identified an issue.

(c)   Better responses demonstrated the ability to analyse the data/information requirements and identified the relationships between the information processes.

Mid-range responses showed some understanding of at least two of the information processes.

Weaker responses included limited discussion of at least one of the information processes or identified a task performed by the system.

Question 27 – Automative manufacturing systems

Better responses related to the automated manufacturing system situation described in the scenario. Candidates are reminded that they should relate their answers to the stimulus material in the question and avoid over-generalised responses.

(a)   (i)   Better responses both provided an example and described a reason for automation in a manufacturing system. Many better responses included a block diagram of a simple system.

Mid-range responses gave a reason such as accuracy in performing repetitive tasks but did not give an example of where automation could be used.

Weaker responses provided a role for automation such as providing a safer work environment.

(ii)   Better responses correctly identified a sensor and described an appropriate manufacturing system where a sensor could be used.

Mid-range responses limited their response to describing a manufacturing system where a sensor could be used.

Weaker responses only identified a sensor, such as a light sensor.

(b) (i) Better responses explained critical damping with reference to over damping and under damping and related their answers to the conveyor belt.

Mid-range responses described critical damping but did not relate their answers to the conveyor belts or reference their answers to under damping or over damping.

Weaker responses provided a limited understanding of damping by stating the effect of critical damping.

(ii) Better responses discussed semi-automation in the warehouse with reference to flexibility, commonsense and ingenuity.

Mid-range responses discussed semi-automation in the warehouse with reference to only two of the dot points in the stimulus, for example flexibility and commonsense.

Weaker responses demonstrated a limited understanding by referencing their answers to only one of flexibility, commonsense or ingenuity.

(c) Better responses demonstrated a clear understanding of the system by identifying the data/information requirements of the information processes of collecting, processing and displaying. The responses also identified the relationship between collecting, processing and displaying.

Mid-range responses generally identified the data/information requirements of two of the information processes, without making reference to the relationship between two of the information processes in the stimulus material.

Weaker responses only identified the data/information requirements of one of the information processes.

Question 28 – Multimedia systems

(a) (i) Better responses successfully nominated an appropriate example and used it to describe the difference between multimedia and printed versions of the same information.

Mid-range responses discussed the features of multimedia systems.

Weaker responses confused multimedia with electronic versions and did not discuss multimedia elements – for example video, audio and hyperlinks.

(ii)   Better responses successfully identified and described the software features.

Mid-range responses identified and described one editing process.

Weaker responses described hardware features or related to the information processes of collecting and displaying.

(b)   (i)   Better responses demonstrated a clear understanding of the non-linear structure and the appropriate links to the homepage.

Mid-range responses represented the homepage and showed at least one appropriate link.

Weaker responses re-drew the stimulus material and labelled the multimedia elements of the homepage, which was not a requirement of the question.

(ii)   Better responses demonstrated a clear understanding of the issues by discussing all three of the listed aspects: ease with which data can be modified, integrity of the original source data and the use of the internet to present information in a responsible way.

Mid-range responses demonstrated some understanding of the issues, usually identifying copyright as an important issue.

Weaker responses either identified, or provided limited discussion of, one issue, usually the use of the internet to present information in a responsible way.

(c)   Better responses demonstrated a clear understanding of the issues by discussing all three of the listed information processes and these better responses provided a relationship between these processes.

Mid-range responses identified some of the data/information requirements, usually relating to storage and retrieval or display.

Weaker responses identified or briefly discussed some tasks that would be performed within the system, usually relating to storage and retrieval or display.

Information Processes and Technology
2008 HSC Examination Mapping Grid

Question	Marks	Content	Syllabus outcomes
Section I			
1	1	Communication systems	H1.1, H3.1
2	1	Information systems and databases	H1.1
3	1	Information systems and databases	H2.1
4	1	Communication systems	H1.1
5	1	Communication systems	H1.1
6	1	Project work	H5.1
7	1	Project work	H5.1
8	1	Communication Systems	H1.1
9	1	Communication Systems	H1.1
10	1	Information systems and databases	H1.1
11	1	Project work	H5.1
12	1	Project work	H5.1
13	1	Information systems and databases	H1.1
14	1	Information systems and databases	H1.2
15	1	Communication Systems	H1.1
16	1	Project work	H6.2
17	1	Information systems and databases	H1.2
18	1	Project work	H1.2
19	1	Project work	H1.2
20	1	Communication systems	H1.1
Section II			
21 (a)	3	Project work	H1.1, H2.1
21 (b)	3	Information systems and databases	H1.1
21 (c)	4	Information systems and databases	H1.1, H1.2
22 (a)	3	Project work	H1.1, H7.1
22 (b)	3	Communication Systems	H1.1, H3.1
22 (c)	4	Communication Systems	H1.1, H3.1, H5.2
23 (a)	3	Project work	H5.1, H6.2, H7.1
23 (b)	3	Project work	H2.2, H4.1, H6.1
23 (c)	5	Information systems and databases	H3.1, H5.2
24 (a)	4	Communication Systems	H1.1, H4.1
24 (b)	5	Communication Systems / Information systems and databases	H3.1, H3.2, H5.2

Question	Marks	Content	Syllabus outcomes
Section III			
25 (a) (i)	3	Transaction processing systems	H1.1
25 (a) (ii)	3	Transaction processing systems	H1.1
25 (b) (i)	4	Transaction processing systems	H1.1, H1.2
25 (b) (ii)	4	Transaction processing systems	H3.1, H3.2, H5.2
25 (c)	6	Transaction processing systems	H1.1, H1.2, H2.1
26 (a) (i)	3	Decision support systems	H1.1
26 (a) (ii)	3	Decision support systems	H1.1
26 (b) (i)	4	Decision support systems	H2.1, H2.2
26 (b) (ii)	4	Decision support systems	H3.1
26 (c)	6	Decision support systems	H1.1, H1.2, H2.1
27 (a) (i)	3	Automated manufacturing systems	H1.1
27 (a) (ii)	3	Automated manufacturing systems	H1.1
27 (b) (i)	4	Automated manufacturing systems	H1.1, H1.2
27 (b) (ii)	4	Automated manufacturing systems	H3.1
27 (c)	6	Automated manufacturing systems	H1.1, H1.2, H2.1
28 (a) (i)	3	Multimedia systems	H1.1
28 (a) (ii)	3	Multimedia systems	H1.1
28 (b) (i)	4	Multimedia systems	H1.1, H1.2
28 (b) (ii)	4	Multimedia systems	H3.1, H3.2, H5.2
28 (c)	6	Multimedia systems	H1.1, H1.2, H2.1

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Section II

Question 21 (a)

Outcomes assessed: H1.1, H2.1

MARKING GUIDELINES

Criteria	Marks
• Demonstrates an understanding of a context diagram for this scenario • Better responses will provide a correct solution with all data transfers labelled	2–3
• Demonstrates a limited understanding of a context diagram by having at least ONE correctly labelled symbol	1

Sample answer:
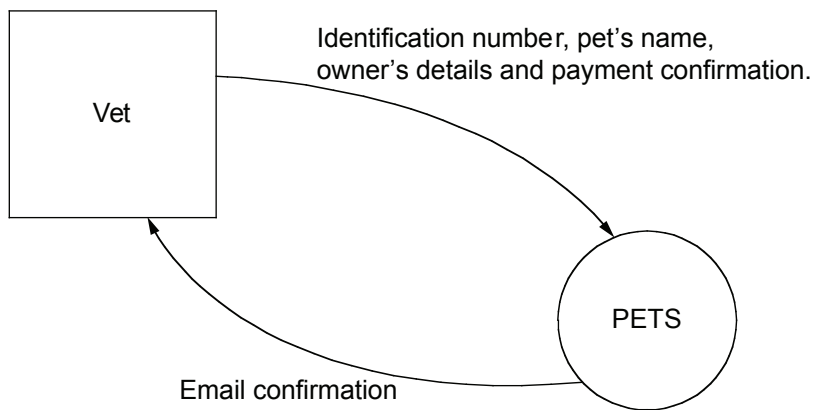
Question 21 (b)

Outcomes assessed: H1.1

MARKING GUIDELINES

Criteria	Marks
• Provides a clear justification for the use of each data type with reference to the characteristics of each data type	3
• Provides clear characteristics and justification for the use of one of the data types AND limited characteristics and justification for the other OR • Identifies a characteristic of both data types	2
• Identifies a characteristic of one of the data types	1

Sample answer:

With reference to the Owner_Telephone_Number field, the text data type is appropriate because it allows numbers with leading zeros to be stored without being lost. If this leading zero were set to numerical data type the leading zero would be lost. The text data type also allows for entry of other characters such as brackets around area codes or spaces. Since no calculations are done on telephone numbers, text is also appropriate.

For the Paid field the Boolean data type is appropriate. It allows for greater data integrity. If it were set to something like text people could enter Yes or Y or True or T. When you search on this field it would not give you all the information, ie Boolean data type improves data integrity. It also saves space in the database.
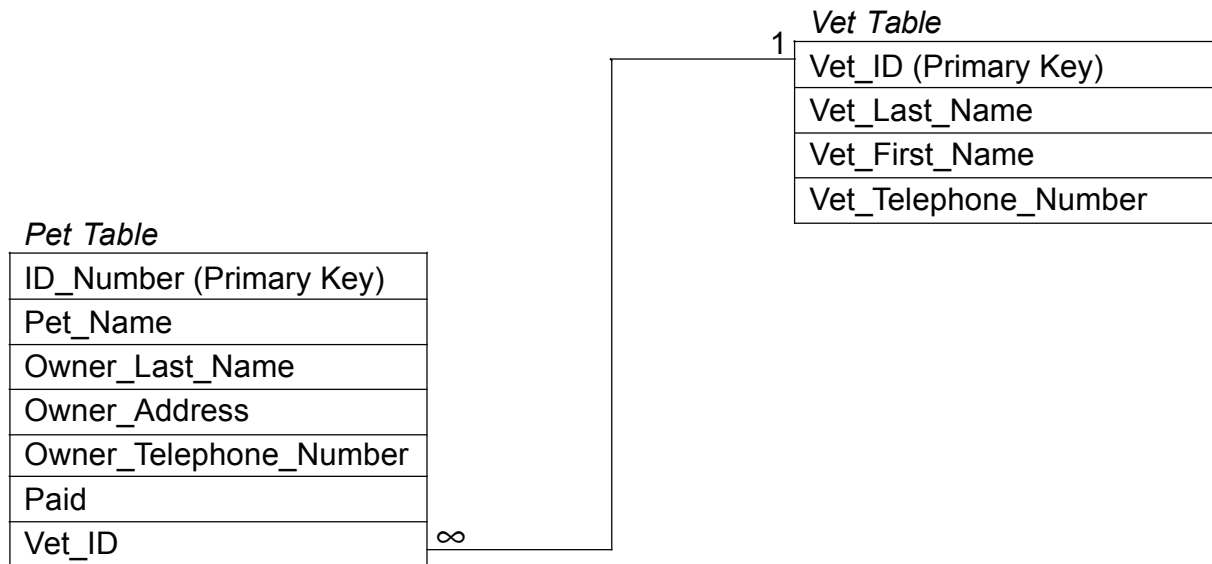
Question 21 (c)

Outcomes assessed: H1.1, H1.2

MARKING GUIDELINES

Criteria	Marks
• Demonstrates a clear understanding of relational databases by providing a multi-table solution with a clear indication of how the tables are related • Better responses will provide a reason for the solution	3–4
• Demonstrates a limited understanding by providing a flat-file solution • Better responses provide a multi-table solution without indicating how the tables are related	1–2

Sample answer

Create a relational database that includes a table specifically for the veterinarian's details. The existing table will need to be modified to include a field called Vet_ ID.

Vet Table

Vet_ID (Primary Key)
Vet_Last_Name
Vet_First_Name
Vet_Telephone_Number

1

Pet Table

ID_Number (Primary Key)
Pet_Name
Owner_Last_Name
Owner_Address
Owner_Telephone_Number
Paid
Vet_ID

∞

This structure will minimise data redundancy, decrease database memory storage and reduce the chance of data inaccuracy as the vet's details would only need to be entered once.

Question 22 (a)

Outcomes assessed: H1.1, H7.1

MARKING GUIDELINES

Criteria	Marks
• Clearly outlines a training plan for staff • Better responses will outline suggestions for most points relating to the scenario	2–3
• Demonstrates a limited training plan for staff by identifying some of the information required	1

Answers could include:

What information staff need to know:

- How all parts of the information system work together
- How to use the barcode/smart-card scanners
- How to access and use the web-based portal and generate attendance reports
- Login and password

How they will be trained:

- Train them in small groups and simulate all the procedures that involve staff in the system
- Scanning of cards
- Accessing the web-based portal
- Generating attendance reports

At what stage they will be trained:

- Train the staff before the system is implemented so as to allow any obvious errors to be rectified before full system implementation

Question 22 (b)

Outcomes assessed: H1.1, H3.1

MARKING GUIDELINES

Criteria	Marks
• Demonstrates a clear understanding of the tasks AND/OR role of the network administrator • Better responses will provide a range of tasks and roles within the NoTruancy system	2–3
• Demonstrates a limited understanding of the task(s) performed by a network administrator with little or no reference to the NoTruancy system	1

Sample answer:

The role of the network administrator in the NoTruancy system includes:

– issuing passwords and logins

– ensuring that smart-card scanners are correctly scanning cards and transmitting this information to the NoTruancy server

– ensuring that the NoTruancy server is continually running and has all teachers and students assigned as users with appropriate system rights according to their roles

– maintaining the web-based and SMS connection from the File Server

– maintaining system security

– backing up the system

Question 22 (c)

Outcomes assessed: H1.1, H3.1, H5.2

MARKING GUIDELINES

Criteria	Marks
• Demonstrates a clear understanding of issues related to the NoTruancy system • Better responses will provide clear characteristics and features for both issues	3–4
• Demonstrates a limited understanding of the issues without reference to the scenario OR identifies issues without description OR provides a description without relating it to an issue • Poorer responses may identify only ONE issue	1–2

Answers could include:

Possible issues for data integrity:
• Students using someone else's card or multiple cards to hide an absence
• Student's card may not have been scanned correctly and SMS message is sent even though student is at school

Possible issues with messaging system:
• Danger of absence data being misinterpreted on the web-based portal or via SMS
• Student absence data is private and may be accessed by people who may not have security privileges to do so via the web-based portal
• Danger of a parent getting an incorrect message when their child is at school

Question 23 (a)

Outcomes assessed: H5.1, H6.2, H7.1

MARKING GUIDELINES

Criteria	Marks
• Demonstrates a clear understanding by providing characteristics and features of at least ONE technique related to the scenario OR providing characteristics and features of TWO techniques • Better responses will provide characteristics and features for TWO techniques with both related to the scenario	2–3
• Demonstrates a limited understanding of the techniques that could be used by naming TWO techniques OR by providing characteristics or features of ONE technique but not related to the senario	1

Answers could include:

Note: If a student describes surveys and questionnaires as his/her two techniques, then he/she should clearly distinguish between them. If the student does not make a clear distinction, then surveys/questionnaire should be considered as one technique.

- Surveys/questionnaires – tools for collecting the needs of the group and what they wish to see on the website. Can be done on paper or electronically. Closed and open-ended questions can be asked but this approach is limited in that questions are set prior to the commencement of the survey. Results of closed questions can be easily analysed by using spreadsheet graphs

- Interviews – each member of the group can be involved in discussions with the designers. An advantage of this technique is that interviews allow the designers to ask different follow-up questions based on the member's original responses and verbal replies and body language can add to the meaning of response

- Observations of students using something similar (eg FaceBook)

Question 23 (b)

Outcomes assessed: H2.2, H4.1, H6.1

MARKING GUIDELINES

Criteria	Marks
• Demonstrates a clear understanding by making a reasonable judgement of the screen design • Better responses will make reference to most of the original objectives	2–3
• Demonstrates a limited understanding by either making a superficial judgement of the screen design OR by making reference to ONE of the original objectives	1

Answers could include:

Evaluation of screen design (an objective was to communicate with ease)

- Home tab should be on far left hand side (by convention)
- 'All' tab and 'Friends' tab are not clear in their purpose

Meeting of objectives

- Secure website – no indication of login or password requirements
- Sharing of photos and videos – facility available to upload these data types
- Sharing of messages – no obvious facility to do this. Is My Friends the place to do this? If so, this is not user friendly or obvious
- No space or format for Name, Gender, Birthday and Star Sign is obvious

Question 23 (c)

Outcomes assessed: H3.1, H5.2

MARKING GUIDELINES

Criteria	Marks
• Demonstrates a clear understanding of points for and/or against at least TWO of these issues • Better responses will demonstrate a clear understanding of all THREE issues	4–5
• Demonstrates a clear understanding of points for and/or against for at least ONE of these issues and addresses at least ONE other issue OR a limited understanding of all THREE issues	3
• Demonstrates a limited understanding of points for and/or against for at least ONE issue • Poorer responses may identify one point for or against ONE issue	1–2

Answers could include:

Access

- Passwords would prevent unauthorised access to site
- The former students would need to have the computer equipment at their home or be able to access the internet if they travel overseas
- By putting all of this information on a website, the group potentially could remain up-to-date with each other's welfare rather than just 'drift apart'

Ownership and Control

- The former students would originally own the data but, by putting it onto a website, other people could be able to retrieve and manipulate this data
- Do individuals or developers own the data?

Privacy Principles

- The website would need to be secured, as intended from the original objectives, to prevent people hacking into the site or others using the photos or videos for inappropriate or unauthorised reasons

- Could a future employer use a search engine to type in the job applicant's name and find out details of their teenage exploits?

Question 24 (a)

Outcomes assessed: H1.1, H4.1

MARKING GUIDELINES

Criteria	Marks
• Demonstrates a clear understanding of strengths and/or weaknesses of these media in this scenario • Better responses will discuss both strengths and weaknesses of most of the media with respect to each other in relation to the scenario	3–4
• Demonstrates some understanding of the properties of these media OR links an issue clearly to the scenario • Poorer responses may identify ONE issue	1–2

Sample answer:

The satellite and wireless technologies are highly effective in this situation. The only other option would be to cable all the sensors back to the base station. This would require a lot of cable. The cable length may be a problem. The signal may have to be regenerated every 100 m or so. Cable would be more expensive and prone to damage and would be difficult to repair and install. Wireless communication is effective because there is only a small amount of data being transmitted and it is more cost effective.

The wireless communication uses radio frequencies to transmit data to the wireless receiver. The data would be broken into packets. Each wireless sensor would have its own TCP/IP address to uniquely identify the sensor.

The satellite link is essential to get the data back to the national database. Cabling into the remote area would cost too much. The satellite link uses microwaves and line of sight. The batch processing of data once a day also helps keep the cost down and only uses the link when needed eg 10 minutes per day.

Question 24 (b)

Outcomes assessed: H3.1, H3.2, H5.2

MARKING GUIDELINES

Criteria	Marks
• Demonstrates a depth of understanding by identifying a range of points relevant to the specified issues and drawing out some implications of those points • Better responses will identify and discuss relevant points for all of the issues	4–5
• Demonstrates some understanding by identifying some points relevant to the specified issues • Better responses will draw out the implications of those points	2–3
• Demonstrates limited understanding by identifing at least one point relevant to any of the specified issues	1

Sample answer:

The issues relating to these communication systems would include:

Changing nature of work for the rangers: Instead of taking the daily measurements, rangers would have more time for other important duties. However they may have to spend time maintaining the communication links and replacing broken sensors. They may need to be retrained for this system support role.

Accessibility of data to the general public: People with an interest in wildlife would have access to better information. However, poachers might use the system to locate protected fauna. The system might attract wildlife watchers to remote regions, who mean no harm, but their high numbers alter the local environment.

Changing nature of work for scientists: The system collects more comprehensive information than the old system, thus allowing the scientists to study more things about animals. The scientists would not have to spend time traveling to remote regions to study the wildlife, and thus they may be more productive. On the other hand, maybe the scientists like to get out of the office from time to time. Also, scientists may not use the data effectively because of environmental factors that are not collected by the system but are obvious to anyone visiting the location.

Section III

Question 25 (a) (i)

Outcomes assessed: H1.1

MARKING GUIDELINES

Criteria	Marks
• Clearly explains why transaction processing systems are easily computerised, providing a relevant example to support the explanation	3
• Provides some reasons why transaction processing systems are easily computerised AND/OR use of a relevant example	2
• Provides some basic information about transaction processing systems with some relevance to the question OR • Provides an example of a transaction processing system	1

Sample answer:

Transaction processing systems are easily computerised as they are based on clear sets of rules/processes. As computers are based on rules/processes it makes it easier to convert TPSs. Computerised TPSs follow the same set of rules/processes that participants would in equivalent manual systems.

An example would include bank tellers being replaced by ATMs that follow the same rules/processes in the transaction.

Question 25 (a) (ii)

Outcomes assessed: H1.1

MARKING GUIDELINES

Criteria	Marks
• Identifies a wide range of relevant data/information elements recorded by a transaction processing system used in a ticket reservation system	3
• Identifies some data/information elements recorded by a transaction processing system used in a ticket reservation system	2
• Identifies a relevant piece of data/information recorded by a transaction processing system used in a ticket reservation system	1

Sample answer:

Transaction processing systems are used in a ticket reservation system to:
- store details of the customer, including name, address, phone number and email address
- store the number of tickets purchased
- allocate seat numbers
- record the payment amount, payment type, payment date etc….

Question 25 (b) (i)

Outcomes assessed: H1.1, H1.2

MARKING GUIDELINES

Criteria	Marks
• Demonstrates a clear understanding of both batch and real-time processing that occur, providing an example of either from the Self-Checkout System • Better responses will distinguish the difference between real-time and batch processing with relevant examples	3–4
• Provides a limited understanding of either batch or real-time processing • Poorer responses may only identify a single batch or real-time process	1–2

Sample answer:

Real-time transaction processing refers to an immediate processing of transaction data. In the case of the Self-Checkout System an example of a real-time process is when an item is scanned and then placed in the bag for weighing. Once the weight is verified it is added to the list of items to be purchased. Batch processing refers to the grouping of transactions until later time when they can be processed. In the Self-Checkout System, an example of batch processing could be the updating of stocked items only after the final transaction of all items has been completed.

Question 25 (b) (ii)

Outcomes assessed: H3.1, H3.2, H5.2

MARKING GUIDELINES

Criteria	Marks
• Clearly discusses the impact that the Self-Checkout System will have on customers • Better responses will clearly cover all listed aspects	3–4
• Demonstrates limited understanding of the impact of the Self-Checkout System on customers • Poorer responses may only identify ONE aspect	1–2

Answers could include:

Data accuracy:

• barcode scanning up incorrect product

• customers not scanning all goods and not placing in the bags giving an incorrect total cost

• weight of the good recorded is incorrect to its actual weight

System failure

• if the system were to fail, such as the weight not registering causing a suspension in the transaction there must be a manual process to ensure that the transaction can still be completed

Equity of Access:

• will the voice commands be in English only or will there be a choice of languages to allow all people to use Self-Checkout System?

• people with disabilities such as blind people will be able to access the system as it has voice commands

Question 25 (c)

Outcomes assessed: H1.1, H1.2, H2.1

MARKING GUIDELINES

Criteria	Marks
• Demonstrates a clear understanding of the system by identifying the relationships of the data/information requirements to each of the listed information processes • Better answers will identify a relationship between them	5–6
• Demonstrates some understanding of the system by identifying some of the data/information requirements for at least TWO of the information processes • Better answers will have an understanding of the system by identifying the data/information for most of the listed information processes	3–4
• Identifies a task performed within the system OR • Demonstrates a limited understanding of the system by identifying the data/information for ONE of the information processes	1–2

Answers could include:

Collecting:

- Barcode data from item
- EFTPOS Card details (ie PIN, card number)
- Real weight of each product

Analysing:

- Barcode data compared to database of stock items
- Real weight of item compared to stored weight of the item
- Analysing the weight of the bag and comparing it to what the weight should be, based on number and type of items scanned

Storing and Retrieving:

- Storing items sold in a database
- Storing number of items left in stock based on purchases made through system
- Storing final transaction data
- Retrieving item details based on barcode scanned
- Retrieving account details and available funds from bank for EFTPOS transaction

Question 26 (a) (i)

Outcomes assessed: H1.1

MARKING GUIDELINES

Criteria	Marks
• Clearly states the meaning of *data mining* with a relevant example	3
• Gives a basic definition of *data mining* OR • Provides an example	2
• Identifies a feature of *data mining* of some relevance to the question	1

Sample answer:

Data mining is the process of discovering new information by analysing a data store to identify patterns and trends. Data mining could be based around a series of IF THEN rules. For example, a company may use data mining tools to identify trends in sales of a product based upon changes in the sales price. They could identify the growth or fall in sales volumes based on the product price.

Question 26 (a) (ii)

Outcomes assessed: H1.1

MARKING GUIDELINES

Criteria	Marks
• Demonstrates a clear understanding of at least TWO tasks performed by the *knowledge engineer* in the creation of the expert system	3
• Identifies at least TWO tasks performed by a *knowledge engineer* OR • Provides a description of ONE task	2
• Identifies a task performed by a *knowledge engineer*	1

Sample answer:

The *knowledge engineer's* role in the creation of the expert system is to develop the rules that will be used to build the system. The knowledge engineer analyses the facts and determines which questions need to be answered next. He defines the relationship using things like decision trees. He should also identify what data needs to be collected for the system to work properly – the knowledge engineer designs the inference engine used by the system.

Question 26 (b) (i)

Outcomes assessed: H2.1, H2.2

MARKING GUIDELINES

Criteria	Marks
• Designs formulae for E4 and G4 that are essentially correct and that permit the formula for G4 to be filled down	4
• Designs formulae for E4 and G4 that are essentially correct but have some errors that would prevent G4 to be filled down	3
• Designs formulae for E4 AND/OR G4 that include some key features, but includes significant errors	2
• Designs a limited response for the formula E4 OR G4	1

Sample answer:

Formula for cell E4: =B4/C4

Formula for cell G4

=IF(AND(E4>=$L$2, E4<=$M$2),
 $N$2,
 IF(AND(E4>=$L$3, E4<=$M$3),
 $N$3,
 1))

Question 26 (b) (ii)

Outcomes assessed: H3.1

MARKING GUIDELINES

Criteria	Marks
• Clearly discusses the implications of the 'beautiful face' system on individuals assessed • Better responses will discuss a variety of impacts	3–4
• Demonstrates limited understanding of the impact of the 'beautiful face' system on individuals assessed • Poorer responses may identify any ONE aspect	1–2

Sample answer:

The system may have both positive and negative impacts on individuals. Individuals that score well using the system might see their careers in the entertainment industry boom benefiting themselves and promoters. On the other hand individuals that receive a low score may be impacted negatively and may be overlooked for jobs even though they have skills to perform well in their industry. There is a danger that people could be labelled as ugly just because they get a low score. The system does not take into account cultural differences or other attributes of an individual's personality that may make them attractive.

There is a real danger that individuals could claim compensation from users of the system if it is shown that the system unfairly discriminates between individuals.

Question 26 (c)

Outcomes assessed: H1.1, H1.2, H2.1

MARKING GUIDELINES

Criteria	Marks
• Demonstrates a clear understanding of the system by identifying the relationships of the data/information requirements to each of the listed information processes • Better answers will identify a relationship between them	5–6
• Demonstrates some understanding of the system by identifying the data/information requirements for at least TWO of the information processes • Better answers will have an understanding of the system by identifying the data/information for most of the listed information processes	3–4
• Demonstrates a limited understanding of the system by identifying the data/information for ONE of the information processes OR • Identifies a task performed within the system	1–2

Sample answer:

The original data input into the system would be a digital bitmap image. This data would be collected using a digital camera and imported into the system. Care would have to be taken to standardise the way photos are taken so that the images can be processed the same way. The facial measurements are provided by the image software. These would have to be typed into the spreadsheet in the columns/rows defined for that data. The spreadsheet data needs to be organised in such a way that relative and absolute references in formulas work properly. This organisation is defined by the system designer.

The run data is analysed using the formulas in column, ie the IF THEN rule. This analysis process reports the score back to the user and becomes the information output by the system.

Question 27 (a) (i)

Outcomes assessed: H1.1

MARKING GUIDELINES

Criteria	Marks
• Clearly describes ONE reason for using automation in a manufacturing system AND clearly describes a relevant example	3
• Provides ONE reason for using automation in a manufacturing system OR • Clearly describes a relevant example	2
• Identifies a role that automation may have within a manufacturing system OR • Provides an example of automation	1

Sample answer:

In a car manufacturing system, robot arms could be used to assemble parts to improve production speed and improve safety.

Answers could include:

– Used for repetitive tasks
– Allows for faster decision making
– Increases safety in the manufacturing system
– Reduces the cost of manufacturing
– Facilitates quality control
– Allows for precision and acceptable tolerance range
– Increases productivity
– Design gains through simulating and modelling

Question 27 (a) (ii)

Outcomes assessed: H1.1

MARKING GUIDELINES

Criteria	Marks
• Correctly recognises and names a type of sensor • Clearly describes a manufacturing situation in which the sensor could be used	3
• Recognises a type of sensor AND correctly recognises a manufacturing system where a sensor could be used OR • Describes a manufacturing system where a sensor could be used	2
• Recognises a type of sensor OR where a sensor could be used in a manufacturing system	1

Sample answer:

Answers could include sensors measuring:

– temperature
– pressure
– motion
– flow
– light

Question 27 (b) (i)

Outcomes assessed: H1.1, H1.2

MARKING GUIDELINES

Criteria	Marks
• Explains critical damping with reference to under and over damping • Better responses will relate to the scenario	3–4
• Demonstrates limited understanding of the types of damping • Better responses may relate to the scenario	1–2

Sample answer:

Critical damping is a quick response to change and a quick return to stability. In this situation critical damping is required on the conveyor belt to ensure that when the boxes are dropped onto it, the belt's tension is adjusted quickly to ensure the boxes do not bounce off. Similarly, the speed of the belt may also be critically damped so that the belt doesn't move with a jerky motion.

Question 27 (b) (ii)

Outcomes assessed: H3.1

MARKING GUIDELINES

Criteria	Marks
• Provides points for and/or against the use of semi-automation with reference to: flexibility, common sense and ingenuity, and relating directly to the scenario	4
• Provides points for and/or against the use of semi-automation with reference to TWO points listed in the question, relating points to the scenario OR • Identifies THREE points for and/or against with reference to semi-automation, making some reference to the scenario	3
• Identifies issues related to TWO of the THREE points listed in the question which may not necessarily relate to the scenario	2
• Identifies issues related to ONE of the THREE points listed in the question which may not necessarily relate to the scenario	1

Sample answer:

Semi-automation provides inbuilt flexibility in this system allowing the store person to make decisions which can't be made by a machine, eg the store person provides data confirming that a product has been placed on the conveyor belt. Humans can exercise an element of common sense and ingenuity to solve problems that cannot be addressed by machines, eg if a sensor on the conveyor belt is damaged, then the system may be trying to respond to a situation incorrectly. Humans could quickly recognise the problem and shut the system down or override the system. The argument against the use of semi-automation is that humans are expensive. They get tired. They sometimes don't exercise common sense or ingenuity. Semi-automated systems such as this could fail because the store worker fails to carry out their role properly.

Question 27 (c)

Outcomes assessed: H1.1, H1.2, H2.1

MARKING GUIDELINES

Criteria	Marks
• Demonstrates a clear understanding of the system by identifying the relationships of the data/information requirements to each of the listed information processes • Better answers will identify a relationship between them	5–6
• Demonstrates some understanding of the system by identifying some of the data/information requirements for at least TWO of the information processes • Better answers will have an understanding of the system by identifying the data/information and for most of each of the listed information processes	3–4
• Demonstrates a limited understanding of the system by identifying the data/information for ONE of the information processes • Identifies a task performed within the system	1–2

Sample answer:

Data is collected at a number of times in the system.

The collecting processes include:
 (a) the scanning of the product code (numerical data)
 (b) sensors under the conveyor belt collect data used to dampen the conveyor (numerical data)
 (c) voice/audio data is collected using the microphones

Processing is not carried out in description of tasks – database is updated (storing).

Displaying occurs at the headset and at the computer terminal. Audio information is presented to warehouse staff to direct them to the box on the shelf and information is displayed on the monitor confirming a transaction.

There must be an actuator also that controls the conveyor belt. Data sent to the actuator will speed up or slow down the conveyor. This would also classify as a displaying process.

Question 28 (a) (i)

Outcomes assessed: H1.1

MARKING GUIDELINES

Criteria	Marks
• Clearly provides characteristics and features of ONE difference between a printed version and a multimedia version of the same information AND uses a relevant example	3
• Clearly provides ONE difference between a printed version and a multimedia version of the same information OR • Provides a suitable example	2
• Identifies a feature of a printed version OR a multimedia version without describing the difference	1

Sample answer:

One difference between print and multimedia is the level of interactivity and involvement by participants. An online newspaper allows participants to navigate through the site with ease, view video footage and listen to audio content. The printed version for the newspaper is read in a more linear manner with minimal interactivity and involvement by the reader. Print is available to everybody but multimedia is only accessible by people with a computer.

Question 28 (a) (ii)

Outcomes assessed: H1.1

MARKING GUIDELINES

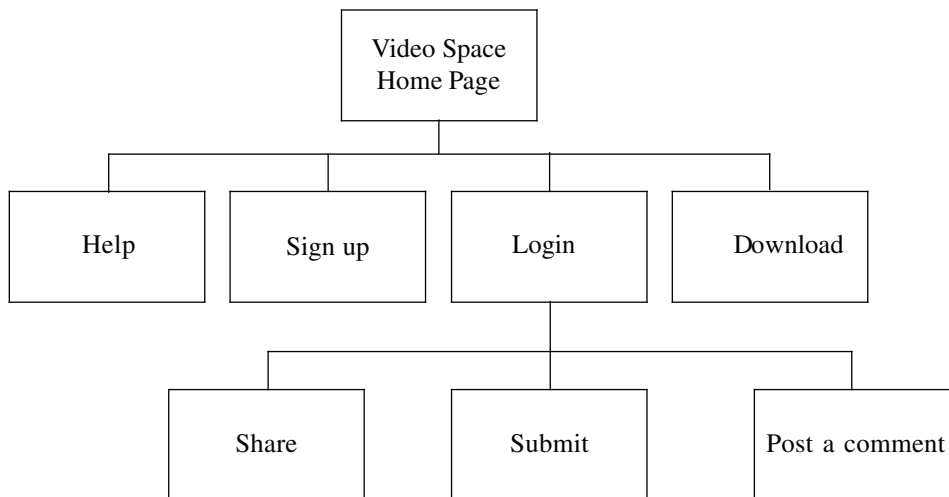| Criteria	Marks
• Describes TWO video processing software features	3
• Describes ONE video processing software feature OR • Identifies TWO features	2
• Identifies ONE video processing software feature	1

Answers could include:

Processing as a result of:
  – video data and frame rates
  – image processing, including morphing and distorting
  – animation processing
• the integration of text and/or number, audio, image and/or video
• compressions and decompression of audio, video and images
• hypermedia as the linking of different media to another

Question 28 (b) (i)

Outcomes assessed: H1.1, H1.2

MARKING GUIDELINES

Criteria	Marks
• Demonstrates a thorough understanding of the organisational structure of the website • Better responses will correctly label pages and indicate appropriate relationships between pages of the site	3–4
• Demonstrates a limited understanding of the organisational structure of the website • Poorer responses will have limited components of a site map	1–2

Sample answer:

Question 28 (b) (ii)

Outcomes assessed: H3.1, H3.2, H5.2

MARKING GUIDELINES

Criteria	Marks
• Demonstrates a clear understanding of the issues related to the use of the Video Space website • Better responses will cover all of the aspects	3–4
• Demonstrates a limited understanding of the issues related to the website • Poorer responses may only identify ONE issue	1–2

Answers could include:

Ease with which data can be modified:
• Videos can only be modified if they are downloaded, modified and re-uploaded
• Modification of comments made by other users
• Ratings can/might be modified as more people view and rate the videos

Integrity of the original source data:
• Does the original video data have copyright restrictions?
• Does it depict reality or is it falsely representing a situation?
• Verification of the integrity is hard to make as usernames/handles are used to identify the originator of the data

The use of the internet to present information in a responsible way:
• Ensuring that inappropriate videos/comments are filtered
• People uploading agree to NOT infringe copyright
• Removal/banning of users who do not comply with website regulations.

Question 28 (c)

Outcomes assessed: H1.1, H1.2, H2.1

MARKING GUIDELINES

Criteria	Marks
• Demonstrates a clear understanding of the system by describing the relationships of the data/information requirements to each of the listed information processes • Better answers identify a relationship	5–6
• Demonstrates some understanding of the system by identifying some of the data/information requirements for at least TWO of the information processes • Better answers will demonstrate an understanding of the system by identifying the data/information for most of the listed information processes	3–4
• Demonstrates a limited understanding of the system by identifying the data/information for ONE of the information processes OR • Identifies a task performed within the system	1–2

Answers could include:

Displaying:
- Bit depth to make the resolution of the display device
- Need sufficient bandwidth to deal with the data required

Processing
- Compression and decompression of audio, image, video
- Hypermedia – linking media together

Storing and retrieving
- File formats used to store different types of data
- Compression and decompression.