

**Written Examination Paper**

For the first time in Tasmania, all candidates who did this exam completed it on computer.

Each candidate used a computer running eExam software (courtesy of the University of Tasmania).

The software had all network capabilities disabled, so was unable to communicate with any other computer, the Internet or any printing facilities.

The operating system and software were loaded from a TQA-supplied USB stick, and the files for each of the 2 sections candidates answered were then saved back to the USB stick. These files were then retrieved these files from the USB sticks by the TQA.

The feedback from teachers and some candidates who were interviewed was that it was a highly successful method for giving an exam in such a subject as this.

Using this software, it was felt that the standard of answers showed a general improvement in addressing the criteria and more clearly answering the questions given. It appears that candidates wrote more, and gave more detail in their answers, and readability was not an issue in determining ratings (although some candidates' spelling and grammar continued to be of concern).

Many candidates could improve the clarity of their answers by using better presentation techniques. Suggested layout techniques include separating paragraphs to more clearly show different points, and to ensure that they answer all parts to a question.

Effective use of dot points includes:

- clearly outlining the key and relevant points
- giving more detailed explanation to make the point clear.

**The assessed criteria:**

Overall, **criterion 1** was addressed least effectively, with many candidates unable to clearly relate to the scenario of working with information technology in non-familiar settings. They were able to discuss the technology but often not able to apply it to the unique issues that some of these scenarios posed.

**Criterion 2** was successfully answered by the majority of candidates. Their understanding of components of an information system and their relationships was good.

For **criterion 3**, candidates showed a sound understanding of the social issues associated with information systems, although at times there was little more than a cursory explanation of the risk factors to consider in the scenario.

## SECTION A

This section was completed by 56% of candidates, and generally answered well.

### Question 1

Most candidates demonstrated knowledge and understanding of how real world information problems are analysed and solved. The candidates mostly identified relevant stakeholders and methods of getting information.

(a) **Possible stakeholders, and ways to get reliable information:**

- Bank – financial considerations, loan management, repayments, feasibility study expected?
- Business advisor/accountant – as above
- Family – commitment from family?
- Others in business – their experiences, difficulties, lessons learned, shortcuts possible?
  - who do **they** recommend we talk with, contacts to be made
- Local council – planning restrictions/approvals required?
- Horticulture items suppliers, vegetable retailers

(b) **Economic feasibility of door-to-door deliveries**

Many candidates interpreted ‘door-to-door deliveries’ as ‘door-to-door selling’ and therefore missed the opportunity to comment about how a delivery system might be analysed.

Possible answers:

Look at others doing door-to-door deliveries

- what do/do not they do well?
- what setup(s) do they have?

Costs of vehicle, staff, licence(s) – plan a spreadsheet to document all costs?

Time frames involved

eg. guarantee availability/delivery at fixed times

Do surveys of potential customers to see whether they want/will pay for d-d deliveries

Do one or more test runs

### Question 2

(a) **Improving the current ordering system:**

Many candidates did not read and interpret Question 2 well to glean that the intent was to improve the **current** ordering system. Most candidates provided two alternatives; however better answers contained two realistic **data collection** alternatives that use **contemporary** information technology.

Possibilities:

- (1) Encourage purchasers to send orders by **email**
  - written record (printed)
  - confirmation of receipt – automatic?
  - can have a standard format,
    - eg. email the week’s order form each week, they return it filled in
  - standard format helpful, may minimise errors
  - can ✓ items as they are completed
- (2) **Online** ordering
  - set up website with ordering capability
    - log in, fill in standard order form
    - generate confirmation of order
  - print out order
    - can ✓ items as they are completed
  - can keep site updated with specials, delivery difficulties (eg. veges not available),
    - notes re veges, eg. cooking/preparation ideas
- (3) Orders done via an app for a smart device, eg. an app for an iPhone, tablet, etc.
- (4) If have to phone, could set up a voice recognition system to record how many of each item they want?
  - may need to have a confirmation system built in ...

(b) **Better option, with justification:**

Detailed discussion of one of above options, or similar

- best features, eg. printed record, minimal chance for error, up-to-date info, easy to read (standard format) for people filling order, ‘low on human demands’
- discuss limitations

(c) **Developing a financial model:**

Many candidates could have improved their answer to this question by recognising that this was requesting a financial ‘what if’ model to be shown, for example by designing and drawing an appropriate simple spreadsheet grid showing appropriate detail. An alternate way could have been to describe in some detail the required inputs, calculations and outputs.

eg. could be done as a spreadsheet, with known values entered, formulae, test ‘what if?’ scenarios as values change

INCOME	Now	Then	Future ..
Farm sales – our veges			
Imported veges			
Door-to-door sales			
TOTALS	?	?	?

EXPENSES	Now	Then	Future ..
Farm costs:			

- rates, water, etc.			
- seeds/plants			
- organic feeds			
- buildings			
Farm equipment			
Labour			
Vehicle(s)			
...			
TOTALS	?	?	?
<b>PROFIT</b>	<b>= inc - exp</b>	<b>= inc - exp</b>	<b>= inc - exp</b>

- compare profits by changing values, etc.

### Question 3

Candidates generally answered aspects of this question well.

Some candidates could have improved their responses by recognising the challenges involving the design and implementation of an e-commerce site by recognising the significant security implications.

(a) **Equipment for setting up a website:**

Some candidates missed the necessity of having an internet connection.

Possible comments:

- decent computer, not 'state of the art' – desktop?/laptop?
- current model preferred – can be rapidly depreciated (in a business)
- decent monitor/HDD
- if want laptop for portability, perhaps need 2<sup>nd</sup> computer for website
- high quality video card not essential, presumably not likely to be making/editing video?
- printer – colour?
- wouldn't want to print too much, but may need to keep copies of order forms
- Internet connection, eg. ADSL2 (broadband) modem, perhaps wireless connection

(b) **Set up, operate and maintain business website - e-commerce website?**

Many candidates incorrectly believed setting up a web server on their home computer for a business application was a viable alternative.

The design and maintenance of a website was often assumed to be within the capabilities and priorities of the two people selling vegetables. More realistic responses would have given candidates a better result.

### **Planning/set up**

- storyboard ideas for website
- maybe work with consultant to refine ideas
  - better for website designer (pro) to do it?
- look at other sites – best features?
  - what is to be avoided?
  - individual feel vs ‘standard style’?
- decide how much of design and construction they can do themselves – may need to learn a fair bit
- explore a Content Management System approach, they look after clearly-defined sections
- continually testing feel/appearance/operation as individual parts approach completion

### **Operate**

- have clear processes for updating, correcting
- obtain order printouts – eg. 4 times per day? Or as lodged?
- at what point does the designer need to make changes to website?

### **e-commerce site?**

- security? – access to robust/secure e-commerce software
  - arrangements with bank?
  - significant overheads (cost) vs public acceptance/use?
- however alternative might just be using Bank Transfer – provide account details
- customer might expect/accept this more now than in recent years

## **Question 4**

Responses demonstrated good knowledge and understanding of the social issues associated with information systems. Better answers showed good understanding of ethical issues, commonly used security solutions such as username and passwords, appropriate testing procedures and awareness of Australia’s privacy laws.

### **(a) Preventing website corruption**

- reputable ISP/hosting site might give quite a degree of protection
- using a good website designer should help build in robust operational procedures
- security of administrator access/ passwords is essential
- might want to consider authorisation for those making payments
- quality anti-virus software, management practices (eg. making sure all software updates are installed promptly)

### **(b) Guaranteeing accurate accounts?**

- if a standard ordering/payment system used, needs to be fully tested from beginning to end to guarantee accuracy
  - eg. testing – make up fictitious clients, an order list, trial bank a/c

- test run as many variations as possible, testing every aspect of data entry/order combinations
- look closely at the way every transaction is handled to be certain of accuracy
- if based on developer's original system, even more robust checking needed
  - check individual modules fully
  - check overall system as per above
- need to check internally at least weekly – set up test clients, and run a different test process each time
- thoroughly investigate any alleged errors, might be error in system, or in procedures

(c) **Accessing customer list for promotional purposes:**

- privacy statement on website?
  - if so, what does it say about use of such info?
  - if not, what might customers expect? Should customers be told?
- Privacy Act – doesn't apply – small business  
(provided not releasing secure details, eg. credit card/bank account details)
- might want to email clients to ask their preferences?
  - always their right to be removed from email list
- possible that bad/negative comments from some people might create 'bad reputation' for them, not worth it for potential return?

## SECTION B

This section was attempted by about 41% of candidates.

### Question 5

To gain a good assessment on Criterion 1, this question needed to be addressed effectively.

(a) **Appropriate business opportunity using his skills?**

This question was often misinterpreted by candidates, who seemed far keener to actually give him a job or suggested that it would be hard to find employers willing to employ him. Many answers didn't list or discuss **how** he might decide about possible employment opportunities.

Possible answers:

- talk with business people
- set up a website advertising his business/skills
  - pay for it to be ranked highly in Google? ...
- promote through Facebook/LinkedIn, other social media sites
- develop contacts with other researchers, employment agencies, etc.
- advertise in professional magazines, eg. for HR people

(b) **Deciding where he would seek to obtain and sell information:**

Again, this often seemed to be answered ‘He can’t work overseas because ...’, rather than consideration of the factors in Dean’s decision. A number of comments were that perhaps employers shouldn’t be looking at applicants’ private lives with regard to possible job opportunities.

Possible answers:

If obtaining/selling info. locally:

- possibly small/limited market – discuss good/bad aspects of ...
- might be applicable to most of his potential employees, but not all (those from interstate/overseas)
- should have good knowledge of law/legal restrictions

Nationally:

- much broader field, potentially many more employers
- also many applicants might have interstate/overseas relevant experiences/information
- still same/similar laws

Internationally:

- access to some info might be more difficult
- legal possibilities/restrictions might vary a lot
- potentially much more information available

## Question 6

(a) **A data structure to allow storage of a lot of data:**

The term ‘data structure’ caused much confusion, with many candidates interpreting it as a filing system, hence referring to the way files are named, folders holding each person’s files, etc. The ‘data structure’ was rarely described in the form of a database or spreadsheet, with little consideration to coping with the volume of data described in the question.

A possible answer:

- data references could be in a **database**

eg. fields: Date

People – those involved/referred to

Description – any details ...

Source/Link – origin, where stored, hyperlink

Rating – using some system, eg. on scale 1 – 5 of ‘importance’?

- needs to be relational? Discuss ...
- weblinks can disappear over time, so might want to copy everything to own drive, incl. video, so hyperlink to own storage device
  - photos could be embedded, small videos linked?
  - develop system of links to related info?
  - good options re searching/presentation of info

- could use **spreadsheet**
  - similar comments to above re design
  - disadvantages – only available in ‘table’ format
    - can’t easily view images/video
- could set up own version of **website**, use search engine software, eg. Google, to search site

(b) **Reliable storage of the data with efficient access and analysis:**

Where the answer to 6(a) was limited or inappropriate, this question was difficult to answer effectively. Many candidates have probably had little exposure to databases of a significant size, for example thousands or millions of records, and were unable to relate their experiences to this situation.

Considerations could include:

- reliable storage of large amounts of data:
  - high quality relational database
  - regular backups
  - RAID storage
- efficient access/analysis:
  - almost certainly database with various database tools
- expect a good level of relevant discussion ...

## Question 7

Candidates who had a good grasp of hardware applied this extensively in this question.

(a) **Hardware, software and communications setup for Dean to supply.**

This question often encouraged applicants to detail their ‘ideal’ computer, or perhaps what they had recently bought. As with all exam questions, the answer needs to reflect the context given.

There was a big range in the amount of details/specifications, but it was not expected that extensive details would be given. More basic but relevant comments were marked well.

Among many references to phone/Skype™ communications between employees, rarely was it made clear that it was primarily **data** (ie. documents) that was being communicated.

Desirable comments:

- emphasis on good Internet connection, reliable storage + Dean’s ability to ‘enforce’ control

Computer:

- current good-quality computer/laptop – good warranty arrangements?
- 2<sup>nd</sup>/3<sup>rd</sup> monitor? – good size
- perhaps 2 x 1TB HDD – RAID storage
- printer ? scanner?

Communications:

- high quality Internet links, eg. ADSL2+ broadband /optical fibre/satellite link
- high level of security features, possibly encryption, v. good firewall-type control

Software:

- needs lot of control over setup and maintaining security
- Windows vs Linux (or similar) OS?
- standard MS Office vs OpenOffice or sim.?
- web browser – IE vs Firefox vs ...
- other software?
- high level of encryption
- ability for Dean to build in features/restrictions?

(b) **Employees couldn't change or misuse it?**

This was often quite well answered.

Dean could try, but might find others have just as much skill as he, able to undo/circumvent

- might be a distraction from their work, setting out to intentionally break system
- computer could automatically report to Dean if certain settings/software/hardware changed

(c) **Technical and economic merits of storing all his data in the 'cloud'.**

Often very well answered, perhaps reflecting that it had been discussed in class. Many candidates had a good range of 'pros and cons' comments.

'Cloud' storage:

- much more common, readily available solutions now (compared with a couple of years ago), universal access
- easy to build in multi-user access

**BUT**

- costs – who pays? (Dean)
- slower – all data has to come via download
- ownership - most online storage contracts say/imply that security/ownership not guaranteed (but more Govt usage now ...)
- potentially easier for others to try to hack storage – so Dean might have his own security concerns ...

- \$\$ - more expensive than big/fast HDD
- on-going monthly costs, probably much more than hardware costs over 1 - 2 years
  - increasing costs to business through slower rate of work (re accessing data)

Suggest that even if cloud storage is used, it would be a good idea to have his own backup of (at least) some files.

### Question 8

Often quite well answered, but candidates are encouraged to be aware of when they are expressing strong personal comments, rather than a less-biased discussion of both sides of a contentious issue (as per details in the Standards document).

- (a) **Should Dean be accessing data stored on other people's computers? Illegal?**  
No candidate made reference to State Government (Tas.) laws covering hacking of information, and electronic intrusion.

- Discuss
- Privacy Act – for larger businesses/Govt agencies
    - so may not cover Dean's situation
  - State Governments – hacking, theft, electronic intrusion, etc.
  - illegal to **attempt** to gain access to someone else's data storage
  - discuss potentially transborder issues.

- (b) **Acceptable for anything available on social media to be used in Dean's work?**
- if able to access any site, eg. person's account, no legal provisions restrict access
    - up to user + provider, eg. Facebook, to establish restrictions to access and to try to enforce them
  - Facebook can bar/limit people trying to access inappropriately
    - but they may try to work around it
  - most social media sites have to be considered 'public access' unless owner applies restrictions
  - not secure sites, like banks

- (c) **Legal, moral and ethical issues involved in making information publicly available**

- only way to restrict is by court/legal challenge?
  - unless proven he hacked/obtained information illegally
  - much info might be drawn from overseas, so fewer legal restrictions?

Social/ethical considerations:

- if paid \$\$ for info, many will choose to earn the money over following 'social norms'
- will have to often make personal (ethical) decisions about what is available/relevant/desired/ethically appropriate

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## SECTION C

33% of candidates chose to answer Section C.

### Question 9

Overall question 9 was answered very well, attracting the higher marks throughout the section and showing that candidates generally had a good grasp on project management principles.

(a) **Analysing current situation:**

Better answers included asking questions with purposes like:

- to identify stakeholders
- to find facts – how things are done now
- to find their goals
- to find their understanding of the situation/future possibilities
- to find financial info
- to find info about their willingness to change/time frames they are working to
- had any complaints? Nature of those?

Look at procedures – actual vs ‘documented’

Look at records, eg. financial, administrative

Talk to drivers?

(b) **Other people to consult:**

Better answers came from candidates who addressed both administrative systems and fuel use and who could be consulted about systems and processes relating to these issues.

Drivers – eg. re efficiency of procedures

Clients – willing to talk about their experiences? Good and bad?

Competitors? – what other systems are available/common in the industry?

Software developers/suppliers – alternative administrative systems?

- relevance/suitability?

Vehicle Suppliers/Mechanics– fault re vehicle type/suitability (ie. fuel economy) as much as process?

GPS System suppliers – Providing more fuel efficient routes and ensuring drivers are not delivering to a suburb more than necessary.

(c) **3 aspects of recommendation:**

Better answers came from candidates who were very clear with their recommended three aspects and what functions needed to be looked at. One candidate spoke about time, cost and scope and how this could be looked at within the business functions, and provided a great depth of insight to the answer.

Candidates could have suggested points like these:

(1) Look at documenting preferred procedures

- maybe drivers act quite independently, don't feel have precise procedures, leading to inefficiencies?

(2) Look at purchasing/setting up contemporary admin. IT system(s), eg. parcel inventory/scheduling/invoicing

(3) Look at delivery scheduling system

- improvement through software solution?

### Question 10

(a) **Better solution for keeping track of parcels:**

Overall this was answered quite well with candidates giving a variety of responses. Many candidates did not provide a data record which ultimately affected the grade given.

A possible answer:

Consider a spreadsheet solution (ie. similar to a flat file database):

- use similar column headings as table
- enter data in successive rows as parcels arrive/collected
- auto entry of date/time from system
- fill in delivery details as relevant

Advantages/possibilities of spreadsheet solution:

- can re-sort to show all undelivered parcels in a group
- can re-sort by suburb:
  - if alphabetically organised, doesn't show neighbouring suburbs together
  - could design numbering/ID systems so that physically nearby suburbs/towns have similar numbers
  - could even base it on actual GPS (lat./long.) co-ords of delivery address, hopefully giving assistance with delivery schedules – but still manually decided
- could develop (eg.) macro to look at undelivered parcels and have continually-current optimised delivery schedules
- could have live link to each van to communicate current schedule/collection delivery data

Example organisation:

Field	Example 1	Example2
Date in – auto allocated	15-11-2011	15-11-2011
Delivery name	Mary	Jim
Delivery address	30 Cypress St Launceston	30 Cypress St Launceston
Item/ID	Parcel – medium 011 223 667	Parcel – small 111 222 333
Delivery date/time – from drivers	15-11-2011 16:25	
Received by	Mary	
Driver	Bill	Tess
Notes	D (delivered)	N (no-one home - not delivered) RTD (Return to depot)

[A similar sort of discussion would be suitable for a database answer.]

(b) **What are the better features of this solution?**

How candidates answered question 10(a) defined how this question was answered. Better answers were generally short and concise while summing up their system advantages.

Good features could have been:

- can easily be sorted on any field
  - eg. customer rings with query – sort by name
  - want to know which are undelivered parcels – sort on delivery date (or Notes)
- can include costs features and use Sum functions to verify accounting records
- can ‘hide’ finalised deliveries (rows) so only viewing outstanding items
- should be able to use a barcode scanner to enter parcel barcodes
- may be able to import delivery details from drivers’ PDAs, when return to depot?
- can obtain figures re number of deliveries to/pickups from specific customers
- can print out daily summary/info at end of each day

(c) **More efficient delivery system:**

Many candidates did not propose an IT solution, instead offering general solutions to fuel economy. Some of the better answers included:

Either:

Put delivery addresses into a travel scheduling program

- re-run after each addition
- rank re urgency? - immediate attention vs ‘same day’

Or:

Write a macro to give some groupings of delivery schedules

eg. numbering/ID systems to organise delivery clusters

(or: Charge customers more for their ‘urgent’ requests which disrupt delivery programs ...)

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## Question 11

(a) **Off-the-shelf vs Public domain vs custom software:**

This question was generally answered very well. It showed that candidates had a good grasp of the three different software solutions and the advantages/disadvantages of each. Better answers came from candidates who addressed all three options and followed it up with a clear recommendation.

Some points made were:

**Off-the-shelf software**

- commercially available, mostly general purpose, which has to be customised for specific application
- may have very large 'user community', so able to get assistance with technical aspects
- may have many irrelevant/unused features
  - but these might be able to give improvements later
- expect to be cheaper than custom-made, as much larger sales volume
- might integrate well with other common software
- might be able to find an existing adaptation which is at least a partial solution

**Public domain software**

- free, may/may not be good quality (ie. robust, ...)
- may be able to find one which is already available for this application, or a similar application
- developer might expect/appreciate 'financial reward', esp. if expecting assistance/support
- may be very limited 'community support' (other than through the developer)
- on-going maintenance?
- may/may not be easy to adapt if need to make fundamental operational changes
  - may involve programming/linking to external data, etc.

**Custom software**

- takes time to design, write, test
- can be designed for your specific requirements
  - but what if they change ... ??
- always in 'testing' phase, as never know when a problem might arise (the only user)
- cost?
- is the developer easy to work with, understands requirements clearly?
  - will be around in later times, for support?

**Recommendation:** depends on explanations given ...

(b) **Communication system with each truck:**

Many candidates were quite naive in regard to the term 'communication'. Often answers only considered voice communication rather than communication in a greater scope (i.e. data, information, wireless, GPS, etc)

Some possible answers were:

- could use mobile phone system – not very sophisticated, limited data options
- could use PDA/iPad (3G) for mobile data transfer – better
  - application running on device, data download/upload capability
  - can have recipient sign for receipt, useful info to have entered into system
  - can monitor actual delivery times
- could use netbook/laptop – complete system on the road
  - fully linked into host server, able to see data as constantly changing

## Question 12

Question 12 addressed Criterion 3 and was answered well; however higher marks were hard to come by.

### (a) **Cheap software:**

Most candidates understood what was being asked of the question, however not many were specific enough in regard to the Copyright Act of 1968. Answers were often too general, not being specific about the implications of the situation. Better answers showed understanding that ‘cheap’ software was not necessarily ‘pirated’.

Some answers included:

Illegal to have (commercially-available) copied software

- most software houses have moved towards on-line registration/ID codes to try to limit options about using illegally-copied software
- discussion re ethical honesty/respect for software developers about reward for time spent, encouragement to develop new software, etc.
- expectation of support/updates when didn't buy software originally?

Perception that developer doesn't actually miss the bit of money you might have paid

- but known that up to 60% of some software is illegally copied , so lot of earnings deprived

Might help the business to have slightly lower expenses

- but what will **they** say when somebody expects to have a parcel delivered to them for no charge??

(b) **Commercial use of Google Earth/Maps:**

To get the better grades on this question, candidates needed to discuss how they would go about the situation that was proposed and possible alternatives. Better answers included reading Google's user policy in regard to use in commercial situations. One candidate suggested that the organisation should not be relying on either Google Maps or Google Earth as if they (Google) close or are down for maintenance how will the business survive without it?

There doesn't appear to be any restriction on reasonable use of Google products in a business

- nothing obvious in the EULA – but unsure how to interpret 2(g) ...

- 2. Restrictions on Use.** Unless you have received prior written authorization from Google (or, as applicable, from the provider of particular Content), you must not:
- (a) access or use the Products or any Content through any technology or means other than those provided in the Products, or through other explicitly authorized means Google may designate (such as through the Google Maps/Google Earth APIs);
  - (b) copy, translate, modify, or make derivative works of the Content or any part thereof;
  - (c) redistribute, sublicense, rent, publish, sell, assign, lease, market, transfer, or otherwise make the Products or Content available to third parties;
  - (d) reverse engineer, decompile or otherwise attempt to extract the source code of the Service or any part thereof, unless this is expressly permitted or required by applicable law;
  - (e) use the Products in a manner that gives you or any other person access to mass downloads or bulk feeds of any Content, including but not limited to numerical latitude or longitude coordinates, imagery, and visible map data;
  - (f) delete, obscure, or in any manner alter any warning, notice (including but not limited to any copyright or other proprietary rights notice), or link that appears in the Products or the Content; or
  - (g) use the Service or Content with any products, systems, or applications for or in connection with (i) real time navigation or route guidance, including but not limited to turn-by-turn route guidance that is synchronized to the position of a user's sensor-enabled device; or (ii) any systems or functions for automatic or autonomous control of vehicle behavior.

[http://www.google.com/intl/en\\_au/help/terms\\_maps.html](http://www.google.com/intl/en_au/help/terms_maps.html) Accessed 24-Nov-2011

- many websites link to GoogleEarth APIs within their applications  
- however if such an application restricted its use in commercial (or similar situations), would be important to register with the copyright owner, or arrange for a license to permit it

(c) **Ethical use of social networking sites like Facebook, Twitter:**

Overall this question was answered quite well. Again, many candidates were not specific enough about the actual problem that was at hand.

Ethical issues might include:

- slander
- appropriateness of using (presumably anonymous) comments to defame someone else's business
- difficulty of countering negative comments, esp. if feeling that are undeserved
- how can you get redress if something wrong has been said about you??
- the gossip that is spread through some of the social media sites ...
- what would she/has she thought about negative comments for her business?

**SECTION D**

About 37% of candidates answered this section.

**Question 13**

**(a) Data collected and entered into a computer:**

This question was generally answered poorly. Many candidates interpreted this question from a software perspective with databases and spreadsheets used as examples of ways to collect data. This made it difficult for the candidates to then answer part (b) effectively. Most showed that they understood how this software could be used to store the data.

There were a few candidates who very accurately answered this question and showed a clear and logical understanding of data collection.

Could consider:

- on paper, manually entered
- on memory card/memory chip (eg. USB stick), uploaded
- communicated by radio link at occasional periods, eg. daily, entered into database

**(b) 'Pros and cons' for 2 possibilities:**

Answers suffered from the same problem as in (a), ie. candidates addressing the question from a software perspective. It was not evident that the candidates understood the nature of data collection in an agricultural (outdoor) setting or considered the methodology of actually physically collecting data from the sensors.

memory card	radio link
<ul style="list-style-type: none"> <li>• plenty of capacity, even on small (cheap) card</li> </ul>	<ul style="list-style-type: none"> <li>• only storing small amount of data locally</li> </ul>
<ul style="list-style-type: none"> <li>• 'robust' storage, should be reliable if not exposed to weather</li> </ul>	<ul style="list-style-type: none"> <li>• may have some difficulty reliably uploading/communication</li> <li>- what happens if upload fails? data lost?</li> </ul>
<ul style="list-style-type: none"> <li>• need to physically collect each, upload - identify where from?</li> </ul>	<ul style="list-style-type: none"> <li>• more complex bases</li> </ul>
<ul style="list-style-type: none"> <li>• only need fairly basic 'base stations'</li> </ul>	<ul style="list-style-type: none"> <li>• can upload as often as desired – more automated?</li> </ul>

## Question 14

(a) **Software for this and future data to be collected and stored:**

This question was generally answered well, with candidates able to identify either a database or spreadsheet as being appropriate software packages to store the data. However few candidates discussed the need for communication software to contact the sensors. Some of the more successful answers identified that there would be a specialised communication and data collection package supplied **with** the sensors. A number of candidates discussed using WiFi but again there needed to be some identification of the limitations of the technology, eg. distance, in situ hardware requirements, etc.

**Collection** - communication software

- to contact each base station (by ID), transfer data
- need to ensure correctly contacts each base station
  - may be some distance (many km) from 'home'
  - perhaps use phone line to each farm, radio communication from there
- perhaps use 3G mobile phone system?
  - phone company costs vs own hardware costs?
 (legal limitations on transmission power will limit own transmission capability)
- test all systems for correct operation before installing

**Storage** – store data in serial data file

- import into database/spreadsheet
- means have to format data in pre-designed way
- consider using XML tagging?

(b) **Commercially-available 'off the shelf' software vs custom-made software:**

This question was answered satisfactorily with candidates identifying some pros and cons of the two options. Many did not consider the need for testing or for the possibilities of the marketing potential of custom-made software or its potential as an income source. The better answers identified the potential cost of custom-made software.

'Off the shelf':

- may be suitable software commercially available, which means it has been thoroughly tested
- possibly many optional features
- has the developers' 'guarantee'?
- probably quite a few configuration options
- means can change expectations over time
- updates over time might give extra features
- possibly fairly cheap, could be quite expensive
- no certainty that quite suitable software already exists – might have to compromise

Custom software:

- might be quite time consuming and expensive to develop
- could be designed to specific expectations
- possibly ultimate flexibility on features provided
- ability to keep improving/add features?
- quality guaranteed? suitable programmer to write the program available?
- rigorous testing process needed to guarantee working properly
- may even assume all is OK, when there is an underlying fundamental flaw ...
- may be able to sell software to other farmers
  - ie. an income source/new business opportunity?

### Question 15

(a) **Medium-quality computer specification, and peripherals:**

This was by far the best answered question in this section of the paper. Almost all candidates could identify a mid-range computing option that Don could purchase. There were some candidates who considered both a desktop and laptop option and made appropriate recommendations which they justified well.

2 x standard computer, eg. Intel i3/i5 processor/AMD equiv.

- suitable RAM (for OS/software), eg. 4-8GB
- standard HDD – alpha-num. data only, so small storage requirements
- ‘standard’ monitor? eg. 52 cm LCD panel
- decent printer, perhaps colour if printing detailed graphs  
(which would probably use significant colour coding)
- network capability
- either – good USB slots for connecting to communications system  
or - card reading slot(s)
- reliable/quality HDD backup system
- OS – Windows or Linux or similar – depends on software?

Portable computer may be OK (ie. meet these requirements), but best if 1 computer fixed (ie. desktop) for connection to communications system

- cheaper to buy desktop than similarly-equipped laptop if portability is **not** required

(b) **Equipment for automatic collection from at least 100 data monitors, and how works:**

This question was generally poorly answered, with candidates discussing the hardware and software but not the processes for collecting data. It was important in this question for the candidates to discuss how the system would work, not just reiterate the hardware and software needed.

Perhaps use mobile phone 3G system:

- mobile-phone-enabled base stations
- transmit XML-coded data to mobile phone system, then to manager's computer
- need communications software
- set up as automated system
- ie.
  - dial station
  - verify ID
  - establish comms link
  - receive data
  - close link, until all stations contacted.
- may be only 10 sec per station?

### Question 16

(a) **Privacy and security of data:**

A generally well-answered question with a good understanding shown of the need for data reliability and accuracy. Less consideration was given to data security, although a number of candidates did discuss encryption of data. Most candidates identified the need for a backup of the system, but few considered redundancy features.

Depends on money spent, quality of system and effort put into building a secure system  
eg. - cheapest price doesn't mean best quality (probably)

- but most expensive doesn't necessarily mean 'best'
- need to look closely at quality/technology available in each aspect
  - eg. 3G comms – may be possible for anyone to ring that number (at least 100 numbers reserved?)
- if data encrypted, unlikely to be decoded/understood what it is
- quality/reliability of transmission, encryption
- each component verified for security

Data lost/destroyed?

- always possible for data to be lost
- at base, eg. faulty sensor/station
- in communication – could data still be deleted when there is a faulty transmission?
- or wait for confirmation of transfer?
- at computer – the computer may die, but only small loss if regularly backed up

If one (or a small number) of monitors fail, still have data from other close-by monitors

So BEST ADVICE:

- pay for good quality – technology, building the system, testing
- have good backup system
- build in redundancy features

**(b) Intellectual property?**

This question was well answered with many candidates able to recognise that the data was not an intellectual property that could be protected. A number of candidates recognised and were able to address the question by considering the different legal aspects of intellectual property, including copyright.

Not an IP which can be protected

- not copyrightable – raw data
- not trade secret – requires interpretation to be useful information

**Types of IP:**

- Copyright – ‘original expression of ideas’
- Trademark – logo/name which identifies business/product
- Patent – of technological feature(s)
- Trade secrets – of benefit to company/industry because they have value in not being ‘public knowledge’
- Electronics circuit diagram – technical designs

**(c) Security of wireless technology:**

This question was well answered, in that candidates were able to recognise the security risks of wireless networks and to identify strategies for protecting the system. However, few candidates discussed whether it was possible or impossible to totally secure a wireless network. The nature of encryption was discussed by some of the better candidates.

From previous discussion, if using 3G phone communication:

- should be encrypted
- should be reliable at mobile phone company end
- should be able to be communicated ‘at call’
- may be easy to build in a log of phone numbers from which the call has been made
  - identify origin of strange calls?

So should be able to be maintained securely.

If other option(s) used, conclusions would depend solely on actual system used.

**Externally Assessed Folio**

A good variety of projects was presented this year, covering the range of D - A standards, with a combination of both individual projects (done with a client) and folios presented by groups. The use of **real** clients was much more apparent this year!

The whole project management process seemed to be much better understood and applied. The following comments apply to this aspect of the folios:

- There was reasonable use of project management proformas/templates, but often these were not customised for their particular project. While the template did help give a

useful structure to the report (and hopefully understanding of the project management approach), the removal of irrelevant and unnecessary aspects would have made the folio a more relevant item.

- The title and scope were often not clearly stated, and many candidates did not include a cover page.
- Criterion 5 ('testing and evaluation') seemed to be addressed much better than in recent years. The examiners were pleased to see discussions and details on the **process** of testing, as much as considering the outcomes, ie. the 'test plans'.
- There were many good journals, providing clear 'progress reports' on how they, or their group, were finding their way through the client's expectations. However it was not helpful for some candidates to use the report to openly criticise others in the group for their (perceived or actual) deficiencies.

In some folios, the examiners had difficulty marking the software according to the published marking scheme, as the software could not be made to work completely, or its design be examined.

- Some websites and databases required a username and/or password, and in a few cases these were not included in the documentation – this made it difficult to assess these folios fully.
- Candidates are encouraged to present an 'unlocked' version of all software, eg. databases, so examiners can inspect the 'back end'/design aspects.
- Where websites are on a teacher-resident site, for example to support an Apache-based/SQL-driven website, teachers need to ensure the site is fully accessible and unchanged at the time of marking. In future years it would be desirable to make a specific statement of those details, including:
  - full access/password details, eg. in a ReadMe file
  - if the software cannot be supplied in full, a comprehensive collection of relevant screenshots would be helpful, and expected.

Probably the majority of candidates appeared to jump straight into choosing the software application they wished to use in the project rather than ascertaining from the client what they wanted, and then 'debating' which software might be appropriate – or at least this is the way most candidates' reports read!

Specific graphics tasks are not appropriate within the Information Systems project task, as they do not fit the guidelines of what an information system is.



<b>Criterion 1 – Demonstrate knowledge and understanding of how real world information problems are analysed and solved</b>	A+ A A-	B+ B B-	C+ C C-	D+ D D-
	demonstrate detailed knowledge and comprehensive understanding of a range of problem solving and project management strategies	demonstrate good knowledge and clear understanding of a range of problem solving and project management strategies	demonstrate sound knowledge and understanding of some problem solving and project management strategies	demonstrate some knowledge and understanding of some problem solving and project management strategies
	provide several clearly articulated and reasonable examples of strategies that could be used in the scenario given	provide some suitable examples of strategies that could be used in the scenario given	provide at least two suitable examples of possible strategies that have some application to the scenario given	provide only one strategy, or alternatives that may include impractical or unreasonable ideas
	critically analyse the ways in which these strategies might be used in various contexts	analyse the ways in which these strategies and skills might be used in various contexts	recognise and describe how these strategies and skills are used in familiar contexts	provide some explanation of how these strategies and skills are used in familiar contexts. Limited links made to the given scenario.

<b>Criterion 2 - Demonstrate knowledge and understanding of the components of an information system, and their inter-relationships</b>	A+ A A-	B+ B B-	C+ C C-	D+ D D-
	accurately describe the components of an information system, and their inter-relationships in various contexts, and analyse the ways in which the components might be used	describe the components of an information system, and their inter-relationships in the contexts given	describe the components of an information system, and their inter-relationships in familiar contexts only	present some relevant information on components of an information system, and some of their inter-relationships
	present a comprehensive list of components that are well described	provide a suitable list of several components that are described	provide information about relevant components with short description of their application	give a restricted list of components, with little description
	critically analyse the capabilities and characteristics of alternatives for an information system in various contexts	analyse the capabilities and characteristics of alternatives for a component of an information system in given contexts	compare the capabilities and characteristics of alternatives for a component of an information system in familiar contexts only	present information on one alternative for components of an information system, without discussion of alternatives
	use appropriate terminology to accurately describe the use of information technology, showing broad understanding	use appropriate terminology to describe the use of information technology, showing good understanding	use appropriate terminology to describe the use of familiar technology, showing basic understanding	use acceptable / limited terminology to describe some familiar information technology

<b>Criterion 3 - Demonstrate knowledge and understanding of social issues associated with information systems</b>	A+ A A-	B+ B B-	C+ C C-	D+ D D-
	recognise, analyse and describe in detail social issues associated with information systems in various contexts	recognise and describe social issues associated with information systems in given contexts	recognise and describe social issues associated with information systems in familiar contexts	comment on some social issues in familiar contexts only
	consistently demonstrate a responsible attitude to the use of information systems	demonstrate a responsible attitude to the use of information systems	demonstrate a responsible attitude to the use of information systems	mostly demonstrate a responsible attitude to the use of information systems
	consistently apply relevant ethical principles in the development and use of information systems	apply relevant ethical principles in the development and use of information systems	apply some ethical principles in the development and use of information systems	aware of and apply some ethical principles in the development and use of information systems

# TASMANIAN QUALIFICATIONS AUTHORITY

ITS315108 Information Technology and Systems

## ASSESSMENT PANEL REPORT

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### Award Distribution

	EA	HA	CA	SA	Total
This year	12% (9)	8% (6)	42% (32)	39% (30)	77
Last year	5% (5)	12% (12)	47% (46)	35% (34)	97
Last year (all examined subjects)	11 %	20 %	39 %	30 %	
Previous 5 years	5 %	17 %	46 %	32 %	
Previous 5 years (all examined subjects)	11 %	19 %	40 %	30 %	

### Student Distribution (SA or better)

	Male	Female	Year 11	Year 12
This year	86% (66)	14% (11)	27% (21)	73% (56)
Last year	82% (80)	18% (17)	35% (34)	65% (63)
Previous 5 years	81%	19%	25%	75%