



22135511



**INFORMATION TECHNOLOGY IN A GLOBAL SOCIETY
HIGHER LEVEL
PAPER 1**

Tuesday 14 May 2013 (afternoon)

2 hours 15 minutes

INSTRUCTIONS TO CANDIDATES

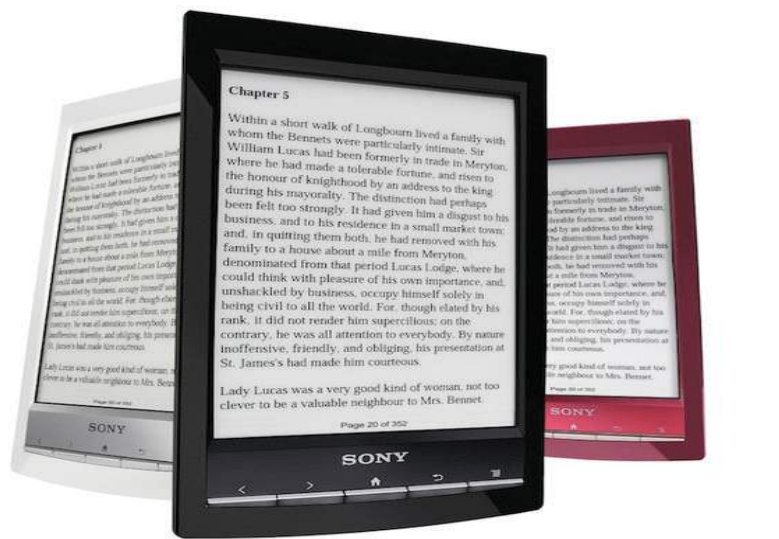
- Do not open this examination paper until instructed to do so.
- Section A: answer two questions.
- Section B: answer one question.
- Section C: answer one question.
- Each question is worth *[20 marks]*.
- The maximum mark for this examination paper is *[80 marks]*.

SECTION A

Answer **two** questions. Each question is worth [20 marks].

1. Libraries and e-book loans

Many libraries around the world are offering electronic books for loan. In some cases you need to check via the e-book reader web page and in others you will need to be a registered member at the library and sign in with a current account into the library website.



[Source: http://cdn1.sbnation.com/entry_photo_images/2117175/prs-t1_large_verge_medium_landscape.jpg. Used with permission.]

The loan systems are able to set the length of the loan period depending on the type of book and how popular it is. The e-book is downloaded to the borrower’s e-book reader. At the end of the loan period some libraries will allow users to check out the books again just like a regular book. When the loan period has expired the book will no longer be available on the user’s reading device.

Libraries may have a limited number of licences for some e-books. Users can make a reservation for an e-book that is not currently available and when it is “returned” they will receive a notification and will be able to borrow it for the assigned period of time.

The library lending system is based on a relational database.

- (a) (i) Identify the steps a new library user must follow to log in to the library and “borrow” an e-book. [4]
- (ii) When e-books are purchased by the library it needs to record information about them in the relational database. All books require ISBN, publisher information, author and title. State **two** pieces of additional information that a library would need to record about an e-book. [2]

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(Question 1 continued)

- (b) (i) Some e-book readers use a proprietary file format, others use generic file formats. Explain **one** advantage for the company who produces and sells the e-books of using a proprietary format. [2]
- (ii) Explain why a relational database has been chosen as the basis of the lending system. [4]
- (c) A school library has introduced the loan of e-books. Discuss the impact on the students. [8]

2. E-waste – recycling and carbon footprint

Abaco Publishing & Design wants to reduce its carbon footprint in two ways:

- by replacing its existing electronic equipment with more energy efficient devices
- by recycling its e-waste.

The environmental manager at the company has requested information on the equipment they have at the office and is using information that *Apple Inc.* has published on its website.

The following table and graph were created using spreadsheet software.

The table lists the equipment found in the office area being evaluated (human resources).

- Cell A3 has the name of the equipment (“60 watt light bulb”).
- Cell B3 has the CO₂ emission for each light bulb (“48.4”).
- Cell C3 shows the number of light bulbs in the area (“8”).
- Cell D3 calculates the total CO₂ emission of the 8 light bulbs.

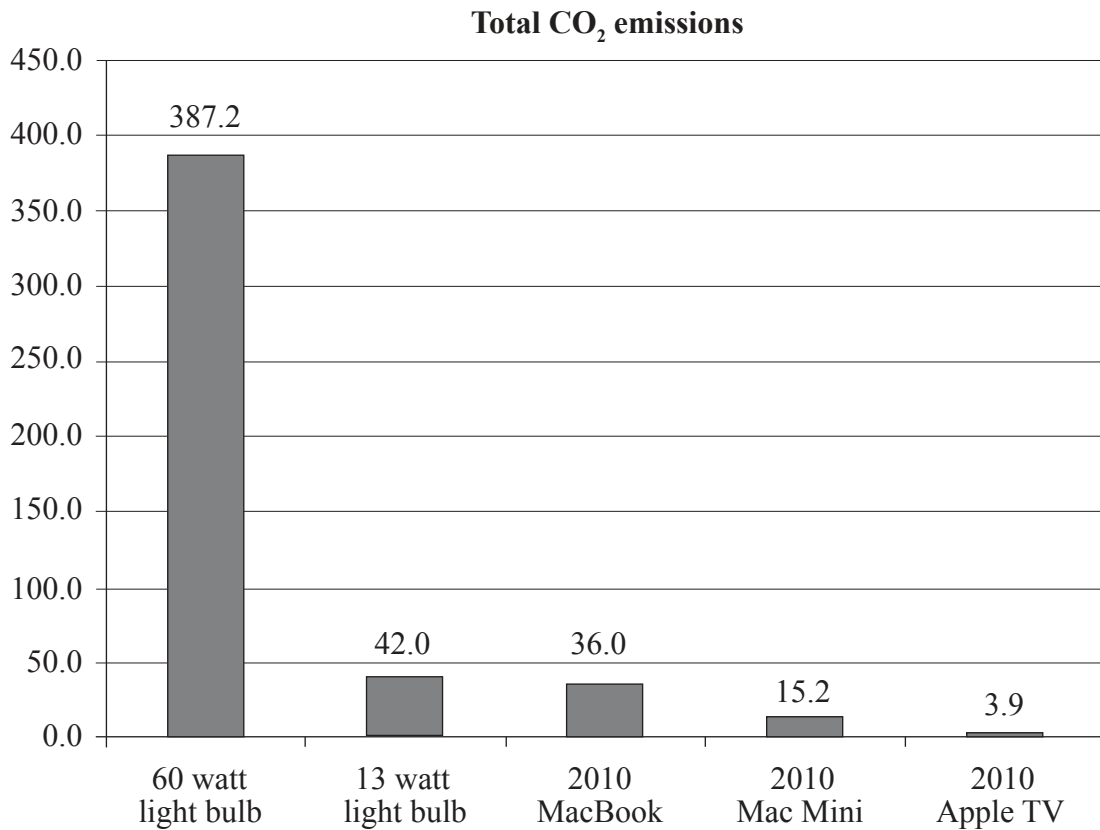
	A	B	C	D
1	Area: human resources (HR)			
2	Type of equipment	CO₂ emissions (grams per unit)	Number available in area	Total CO₂ emissions (grams)
3	60 watt light bulb	48.4	8	387.2
4	13 watt light bulb	10.5	4	42.0
5	2010 MacBook	9.0	4	36.0
6	2010 Mac Mini	7.6	2	15.2
7	2010 Apple TV	1.3	3	3.9
8	TOTAL CO₂ emissions			484.3

- (a) (i) State the formula needed to calculate the value in D3. [1]
- (ii) State the formula needed to calculate the value in D8. [1]

(This question continues on the following page)

(Question 2 continued)

- (iii) Identify the steps required by the user to produce the chart below. [4]



- (b) It is generally desirable to recycle e-waste. Explain **three** effects of the irresponsible disposal of e-waste. [6]
- (c) To what extent can a government encourage the responsible disposal and recycling of IT equipment? [8]

3. Patient monitoring

A hospital is implementing a medical IT system to monitor the vital signs of patients. Monitoring of vital signs, such as body temperature, can provide health care professionals with up to date information about a patient’s medical condition, inform of unusual situations and possibly help avoid serious health consequences.



[Source: <http://sreemonitoring.com/IntellivueMP40andMP50.html>, 12 September 2011]

- (a) (i) State **two** vital signs, other than body temperature, that can be monitored using IT systems to inform doctors of the condition of a patient undergoing surgery. [2]
- (ii) Identify the steps taken by an IT monitoring system to detect when a sign or condition is abnormal and the patient requires special attention. [4]
- (b) Analyse the implications for doctors when the hospital implements new patient monitoring equipment for health care. [6]
- (c) Training will be provided by the hospital for staff to use the new IT patient monitoring system. It was decided to use a combination of online training and practical hands-on training. Justify this decision. [8]

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SECTION B

Answer **one** question. Each question is worth [20 marks].

4. Information systems management

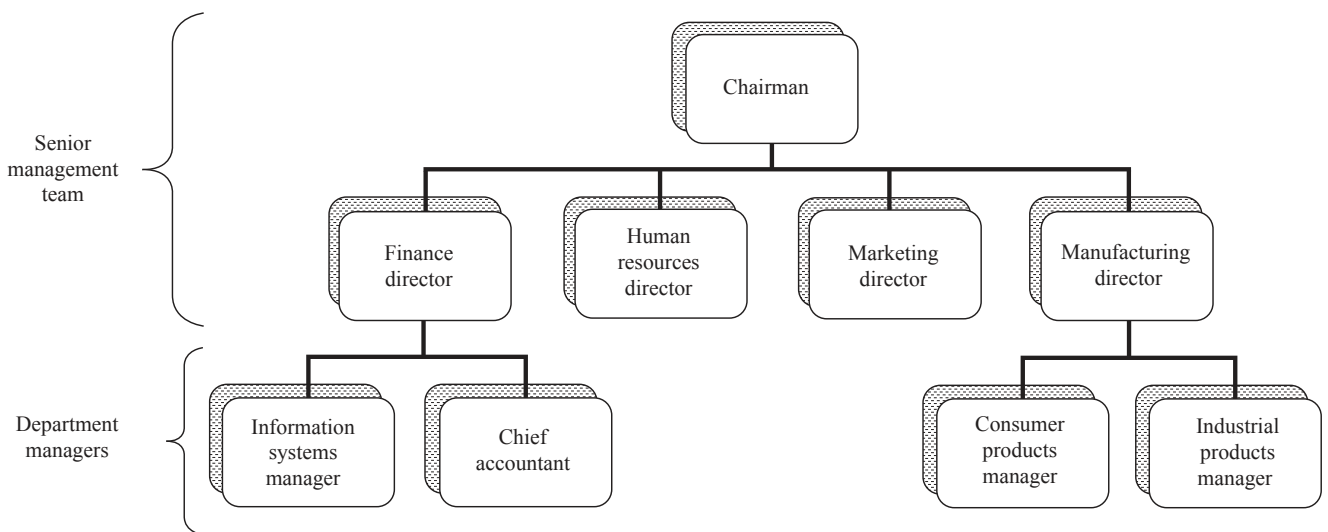
Queen Bee Global Enterprises Inc. has grown rapidly over the last 5 years.

Currently each department has complete independence in the way that they manage their respective IT requirements. Some departments have bought commercial packages and adapted them to suit their needs, while others developed applications using widely available office software. This has led to a range of problems.

The information systems manager has recently recommended that new centralized IT systems should be implemented in order to reduce costs, improve efficiency and facilitate maintenance.

At the moment, the information systems manager is not part of the senior management team that makes the decisions about implementing IT systems. His department is expected to grow significantly over the next two years.

The senior management team is considering the possibility of making the information systems manager a member of the team.



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(Question 4 continued)

(a) (i) Identify **three** responsibilities of a typical information systems manager. [3]

(ii) State the job titles of **three** of the specialist staff who typically report to an information systems manager. [3]

(b) In the past, *Queen Bee Enterprises Inc.* valued staff who showed initiative. However, this led to the development of independent IT systems by different departments in the company.

Explain the problems that may arise when departments are given freedom to develop independent IT systems. [6]

(c) The senior management team of *Queen Bee Enterprises Inc.* has decided to include the information systems manager in the team.

To what extent is it an advantage to have an information systems manager as part of the senior management team? [8]

5. IT system development

A company has ordered a new IT system from a software development company. During the initial investigations and consultations, the developers produce prototypes of the proposed system which demonstrate the user interfaces that will be produced for the system.

Once agreement has been reached, a project plan is developed.

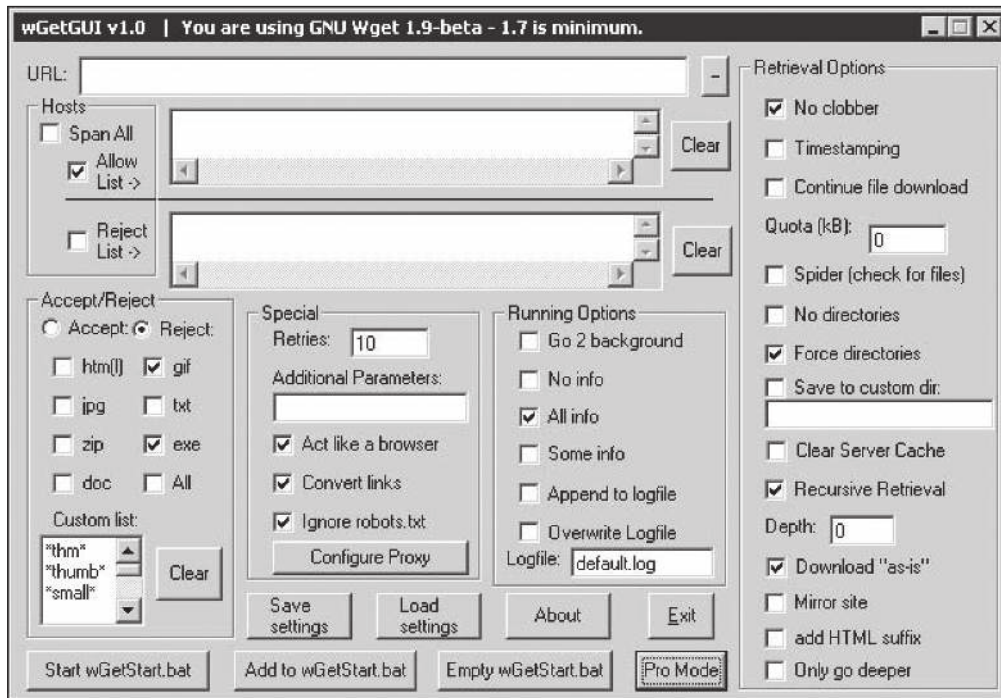
(a) (i) With reference to systems development, define the term *prototype*. [2]

(ii) Describe **two** essential components of any project plan. [4]

(b) The design of user-friendly interfaces is a major part of any new system development project. Below are examples of two different types of interface.

Contrast the usability of the two interfaces shown here. [6]

Interface A



[Source: <http://www.ssw.com.au/ssw/Standards/Rules/RulesToBetterInterfaces.aspx>, 20 August 2011]

(This question continues on the following page)

(Question 5 continued)

Interface B



[Source: http://upload.wikimedia.org/wikipedia/commons/1/1c/Iphone42_Nokia_Lumia920_samsungs3.jpg]

- (c) With reference to examples you have studied, to what extent does the successful implementation of a new IT system depend on regular consultation between the developers, clients and end-users?

[8]

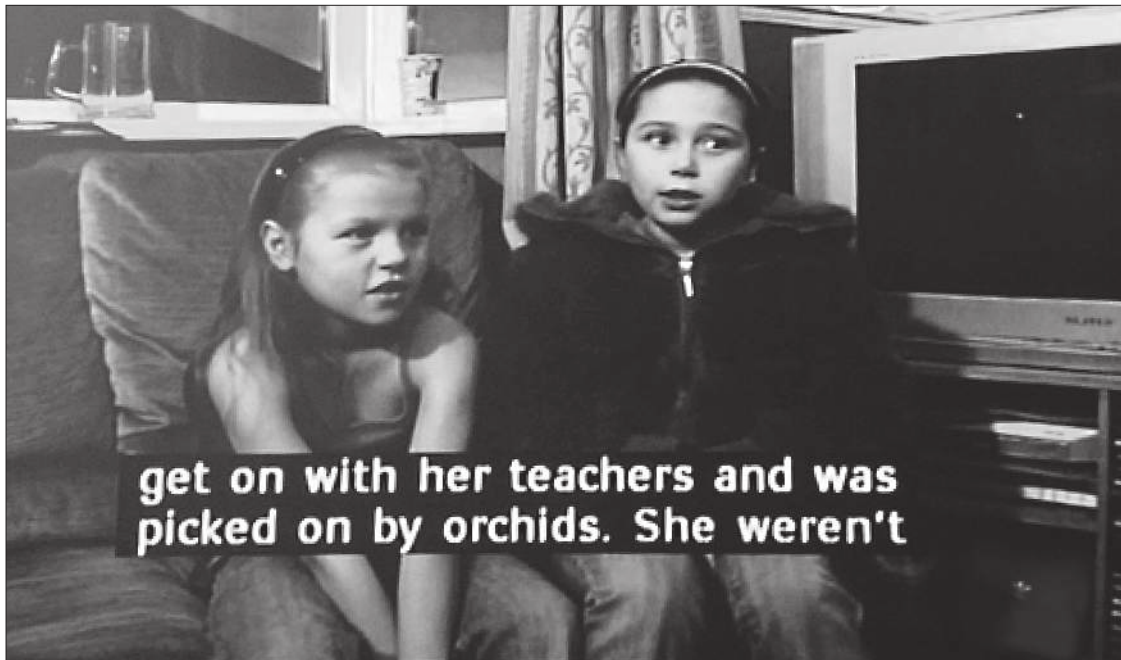
SECTION C

Answer **one** question. Each question is worth [20 marks].

6. Speech to text software

Many television programmes are supplied with subtitles to help viewers who have hearing problems. If the programme is being broadcast live, such as in a news interview, speech recognition software is often used to produce the subtitles as quickly as possible. This usually involves a process called re-speaking, in which an operator repeats the words said by those being interviewed and speech to text software generates the subtitles.

The software and the speaker both have to be trained in order to get the most accurate results. Even so, mistakes often occur. “Recognize speech” can easily be represented as “wreck a nice peach”.



[Source: <http://www.thehumorblog.com/funny-subtitles-wrong-words/474/>, 20 August 2011 Gwydion M. Williams]

- (a) Identify **six** steps that speech recognition systems must go through in converting speech into text. [6]
- (b) Explain why subtitling software works better when re-speaking is used rather than using the original voices of the people being interviewed. [6]
- (c) To what extent will the use of speech to text software be a feature of future IT systems? [8]

7. Robotic vacuum cleaners

A robotic vacuum cleaner is advertised as having:

- Visionary Mapping technology
- 38 intelligent sensors
- auto recharge and resume cleaning
- 6 cleaning modes – auto, max, manual, spot, edge, delay, daily schedule
- 90 minutes running time, 120 minutes charging time.



[Source: http://commons.wikimedia.org/wiki/File:Robot_vacuum_cleaner.jpg]

- (a) (i) Identify **three** sensors that would be useful on a robotic vacuum cleaner. [3]
- (ii) Identify **three** output devices that would be useful on a robotic vacuum cleaner. [3]
- (b) Explain how expert systems can be used to help the manufacturer develop the next generation of robotic vacuum cleaners. [6]
- (c) Considerable research is taking place into the development of humanoid/android robots to carry out a range of tasks that are currently carried out by humans.
- To what extent is the future of robotics likely to be more about single purpose devices such as a vacuum cleaner rather than humanoid/android robots? [8]
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