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

Thursday 14 November 2013 (afternoon)

1 hour 45 minutes

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**INSTRUCTIONS TO CANDIDATES**

- Do not open this examination paper until instructed to do so.
- Answer three questions. Each question is worth *[20 marks]*.
- The maximum mark for this examination paper is *[60 marks]*.

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

**1. Mobile Wallet**

Customers are now using their mobile/cell phone to make purchases at the grocery store. Before this they used a credit card or cash.

On the cell phone there is an application (“the wallet”) that stores the user’s credit or debit information used in transactions. This application uses a form of radio frequency identification (RFID) technology that requires a chip to be installed in their cell phone.

Go to photo source:  
<http://www.carryology.com/wallets/the-mobile-wallet/>

In order to purchase groceries, items are first scanned into the register and a total is calculated. The customer waves their cell phone over the RFID reader, enters their PIN and the total amount for their grocery order is deducted from the customer’s account. Secure encryption technology is used to pass the card information to the credit card company to complete the payment. Grocery stores have found that setting up this system is very expensive.

Many grocery stores are using mobile wallets to gather information about customers’ spending habits and will be offering a lot of incentives to get people to use it, such as discount vouchers and store offers sent to their cell phone.

[Source: Text: adapted from: <http://www.google.com/wallet/>, 24 November 2011  
<http://techcrunch.com/2011/10/09/american-express-to-release-an-api-for-digital-wallet-platform-serve-focuses-on-data-and-personalization/>,  
24 November 2011;  
[http://www.huffingtonpost.com/2011/05/26/google-wallet-money-data\\_n\\_867774.html](http://www.huffingtonpost.com/2011/05/26/google-wallet-money-data_n_867774.html), 24 November 2011.]

- (a) (i) Identify **two** pieces of information that are being collected by the grocery store’s computer system when the bill is paid. [2]
- (ii) Define the term *RFID*. [2]
- (iii) Define the term *encryption*. [2]
- (b) (i) Explain **one** reason why encryption is used in this case. [2]
- (ii) Explain **two** disadvantages for the customer of using “the wallet”. [4]
- (c) To what extent are the security measures used by the store during purchases appropriate? [8]



### 3. Senior Care goes hi-tech with virtual doctor visits

Donna Sergisson waits to see her doctor in her room in the Wayne County Nursing Home where she is a resident. She will not see him face to face, but will use a videoconferencing system.

At the nursing home, Donna is seen by a nurse who can talk using the videoconferencing system to the doctor in a local hospital. Once the videoconference has taken place, Donna is treated by the nurse following the doctor's instructions.



The doctor also has access to the nursing home's electronic record system to type in his assessment, progress and notes, as well as review other doctors' and nurses' comments, look at patient history and what medications patients are taking. The electronic records are held in a database created by the nursing home technical staff.

[Source: adapted from <http://www.waynepost.com/feature/x748725715/Senior-care-goes-hi-tech>, 24 November 2011]

- (a) (i) Identify **two** input devices required for the videoconference to take place. [2]
- (ii) There have been issues with the accuracy of the information held in the database. Describe how validation and verification are used to ensure data is accurate. [4]
- (b) Explain **three** technical issues that would need to be addressed in order to set up an effective videoconferencing system. [6]
- (c) The nursing home technical staff are considering replacing the existing database with a new one. The two options being considered are:
  - purchasing a commercial package that has been developed for institutions such as nursing homes
  - developing the database themselves.Evaluate these **two** options. [8]

**4. Developing a website**

Milner’s Merchandising is a small website developing company based in Montreal. Helen Earle, the owner, has been asked by a local business, Jen Gems, to create a website to advertise their new range of jewellery.

To help her organize the work of her employees Helen has used a spreadsheet to show the length and order of the different development tasks.

	A	B	C	D	E	F
1	Task	Person Responsible	Start date	End date	Duration (days)	Cost
2	Initial Investigation and Consultation	Tammy	15-Feb-2013	19-Feb-2013	4	\$860.00
3	Analysis	Tammy	21-Feb-2013	28-Feb-2013	7	\$1,505.00
4	Project Schedule Planning	Tammy	1-Mar-2013	4-Mar-2013	3	\$645.00
5	Product Design	Susie	14-Mar-2013	29-Mar-2013	15	\$3,225.00
6	Product Development	Susie	5-Apr-2013	22-Apr-2013	17	\$3,655.00
7	Testing	Mark	23-Apr-2013	30-Apr-2013	7	\$1,505.00
8	Updates from Client Feedback	Susie	1-May-2013	6-May-2013	5	\$1,075.00
9	Training the Client	Mark	9-May-2013	15-May-2013	6	\$1,290.00
10						<b>\$13,760.00</b>
11						
12						
13	Daily Rate	\$215.00				

Helen has always used the product development life cycle (PDLC) as a framework for managing projects. Helen is trying to decide whether to allocate the project to one person or to a team.

- (a) (i) State the formula in cell E2. [1]
- (ii) State the formula in cell F2 using an absolute cell reference. [1]
- (iii) Outline why spreadsheet designers should use absolute cell references to calculate costs such as those within column F. [2]
- (iv) Identify **two** problems that can occur when two different people enter data into a common online spreadsheet. [2]

*(This question continues on the following page)*

*(Question 4 continued)*

- (b) The website that has been designed has been tested by the following persons:
- Technical expert
  - Client
  - End users.

For each of the testers above, explain the reason why they are used to test the website. [6]

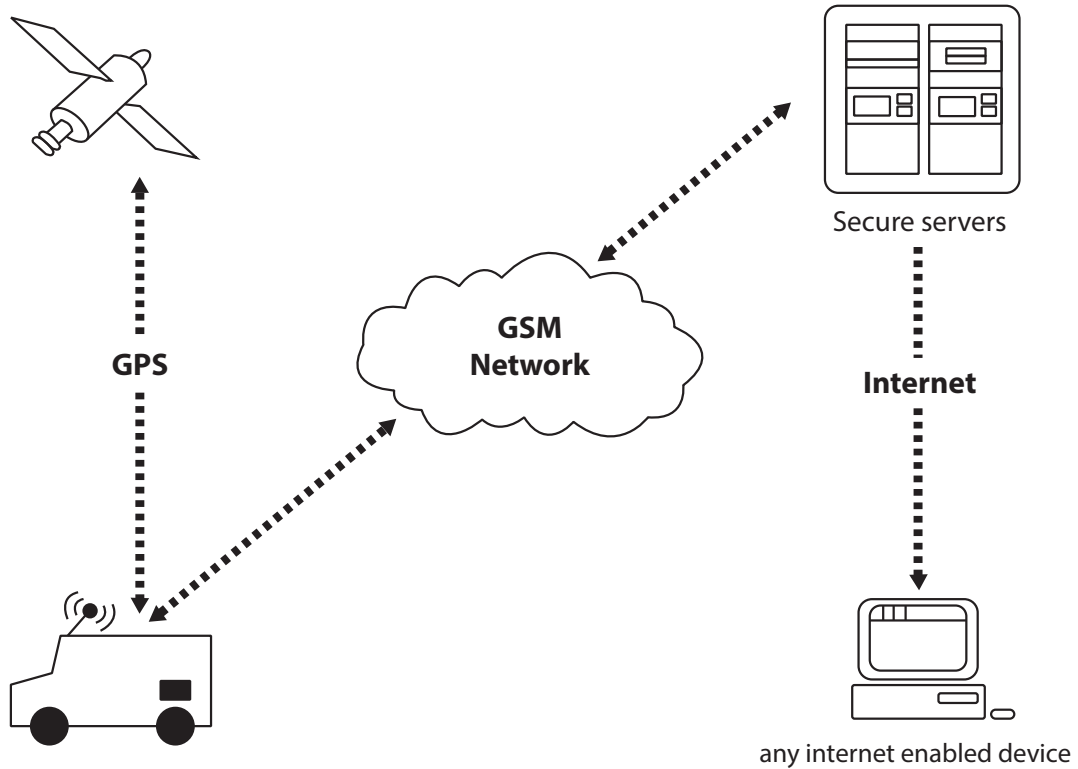
- (c) The owner of Jen Gems is involved in every stage of the website development. The first two stages of the product development life cycle are:
- Initial investigation and feasibility study
  - Analysis.

Discuss the importance of the client's involvement in these **two** stages of the product development life cycle (PDLC). [8]

### 5. Using GPS to monitor vehicle movements

GPS systems help people to find their way around when driving their cars. Trucking companies also use GPS systems in their trucks to keep track of their shipments, routes taken and employees.

A GPS chip is placed in the body work of the vehicle that allows its movements to be monitored from a device connected to the Internet. This idea has been considered by governments and authorities who see this as a way of enforcing the speed limit, monitoring the number of hours driven by a person and detecting unusual patterns of travel.



[Source: adapted from <http://nationalfleettracking.com/media/how-works.jpg>, 24 November 2011  
Used with permission from National Fleet Tracking.]

- (a) (i) State **two** purposes of the server in the diagram. [2]
- (ii) Identify the steps used by the GPS system to locate the position of a vehicle. [4]

*(This question continues on the following page)*



*(Question 5 continued)*

Some GPS companies are providing the data to local governments and authorities. This is used to determine where to construct new roads and where to place speed cameras. This data is anonymous.

- (b) (i) Explain **two** reasons why using only the data collected from the GPS systems to predict traffic flow may not be suitable. [4]
- (ii) Explain **one** reason why civil liberties groups may be concerned about the use of this data by governments and authorities. [2]
- (c) Discuss whether GPS systems such as the one above should be introduced into all vehicles. [8]
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