Student Name:

HORNSBY GIRLS' HIGH SCHOOL

2015

Information Processes & Technology

Preliminary Course

YEARLY EXAM

Time allowed: 90 minutes
(plus 5 minutes reading time)

DIRECTIONS TO CANDIDATES

Multiple Choice (15 marks)

- Attempt ALL questions
- Mark your answers on the Answer Sheet provided

Question 16 (14 marks)

- Answer the questions on separate writing paper

Question 17 (7 marks)

- Answer the questions on separate writing paper

Question 18 (17 marks)

- Answer the questions on separate writing paper

Section	Marks
Multiple Choice	/15
Question 16	/14
Question 17	/7
Question 18	/17
Total	/53
Total	%

Information Processes and Technology Preliminary Course

2015
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Student Name:_____

Questions 1 – 15. Multiple Choice Answer Sheet.

Circle the alternative A, B, C or D that corresponds to the best answer.

Question				
1	A	B	C	D
2	A	B	C	D
3	A	B	C	D
4	A	B	C	D
5	A	B	C	D
6	A	B	C	D
7	A	B	C	D
8	A	B	C	D
9	A	B	C	D
10	A	B	C	D
11	A	B	C	D
12	A	B	C	D
13	A	B	C	D
14	A	B	C	D
15	A	B	C	D

QUESTIONS 1 TO 15: MULTIPLE CHOICE [15 marks]
Attempt ALL questions. Each question is worth 1 mark
Select the alternative A, B, C or D that best answers the question.
Mark your answers on the Answer Sheet provided.

1. What is meant by volatile memory?
(A) The data is stored externally to the CPU
(B) The stored data cannot be changed
(C) If the power is lost, the data values remain stored
(D) The contents are lost when power is lost.

2. Which of the following software features are associated with the process of *Analysing*?
(A) Searching, sorting, what-if scenarios, charts and graphs
(B) File comparison, word processing, audio mixing, video editing
(C) Selection of file type, digitisation of data
(D) Spell check, table of contents, index, footnotes.

3. RAM can best be described as which of the following?
(A) Non-volatile, Primary memory
(B) Non-volatile, Secondary memory
(C) Volatile, Secondary memory
(D) Volatile, Primary memory.

4. Which of the following does NOT represent bias in the collection process for an on-line survey?
(A) Offering the survey to a non-representative sample of participants
(B) Incorrectly calculating percentage responses due to an error in the formula
(C) Rejecting all responses from rural locations
(D) Inviting only male respondents to participate in the survey.

5. During transmission, digital data is represented as different electromagnetic waveforms. Which term describes the process used to create the waveforms?
(A) Encryption
(B) Modulation
(C) Decryption
(D) Demodulation.

6. What is meant by telecommuting?
(A) Using a workstation, laptop or smart-phone to access a web-site
(B) Transmitting data electronically to a remote server
(C) Transmitting data over the internet whilst commuting to one's place of employment
(D) Working at home by using a workstation, laptop or smart-phone electronically linked to their place of employment.

7. Which of the following are devices used for the *displaying* process?
(A) LCD, CRT and plasma screens, printers and plotters, speakers, digital projectors and interactive whiteboards
(B) Mouse and keyboard, scanners and digital cameras and video cameras
(C) LCD, CRT and plasma screens, printers and plotters, video cameras, barcode readers
(D) Mouse and keyboard, scanners and digital cameras, speakers, digital projectors and interactive whiteboards.

8. The equivalent binary number for the decimal number 194 is:
(A) 1110 1110
(B) 1010 1111
(C) 1100 0010
(D) 1101 1110

9. Given that the ASCII code for "A" is 65, what are the ASCII codes for "HD"?
(A) 62, 78
(B) 72, 69
(C) 73, 68
(D) 72, 68

10. Which of the following best describes what is meant by human-centred and machine-centred systems?
(A) Human Centred: a system which makes participants' work as satisfying and effective as possible
Machine Centred: a system which simplifies what the computers do at the expense of participants
(B) Human Centred: a system which simplifies what the computers do at the expense of participants
Machine Centred: a system which makes participants' work as satisfying and effective as possible
(C) Human Centred: a system which utilises participants in part of the processing
Machine Centred: a system which utilises technology in part of the processing
(D) Human Centred: a system which focuses on the role of the participants
Machine Centred: a system which makes best practice use of technology.

11. What is meant by a Mail Merge process?
(A) Creating documents to be printed and mailed out to relevant participants
(B) Creating a number of documents from all of the records in a database
(C) The production of multiple documents from a single template form using data extracted from a structured data source
(D) Using a spreadsheet to provide data into a page to be printed

12. An uncompressed bitmap image file has a resolution of 1000 by 1000 pixels and its storage size is approximately 1 MB. The colours within the file would be taken from a total of how many colours?
(A) 16
(B) 256
(C) 65536
(D) 16777216

13. What are the main features of presentation software?
(A) Spell check, sound editing, video editing, graphics editing
(B) Creation of a slide show, sound editing, encryption, design templates
(C) Inclusion of multimedia elements, use of formulae, spell checking, index, table of contents
(D) Inclusion of multimedia elements, transitions, timings, design templates.

14. Martin is viewing a video on YouTube. Which term best describes the process occurring?
(A) Streaming
(B) Downloading
(C) Uploading
(D) Compressing.

15. The difference between bitmap and vector images includes which of the following?

(A) Vector images generally require less storage than bitmaps
(B) As images are enlarged the resolution of bitmaps decreases whilst vector image resolution doesn't change
(C) Bitmap files describe each pixel whilst vector files describe each shape
(D) All of the above.

QUESTION 16 [14 marks]
ANSWER on separate writing paper, clearly marking question number and part numbers.

a. Define each of the following terms related to information systems. **5 marks**

(i) Data

(ii) Information

(iii) Participant

(iv) Environment

(v) Information technology

b. In terms of the organising and the storing/retrieving information processes describe the difference between characters represented as images and characters represented using ASCII.

3 marks

c. In terms of the collecting and the organising information processes describe the difference between data entry using a keyboard and data entry using optical character recognition (OCR).

3 marks

d. In terms of the processing information process describe the effects of and the difference between increased clock speeds and increased bus capacity when upgrading a computer.

3 marks

QUESTION 17 [7 marks]
ANSWER on separate writing paper, clearly marking question number and part numbers.

a. Identify the essential information technology required to operate an interactive whiteboard.

3 marks

b. Discuss how information can be displayed effectively to those with different degrees of visual impairment.

4 marks

QUESTION 18 [17 marks]
ANSWER on separate writing paper, clearly marking question number and part numbers.

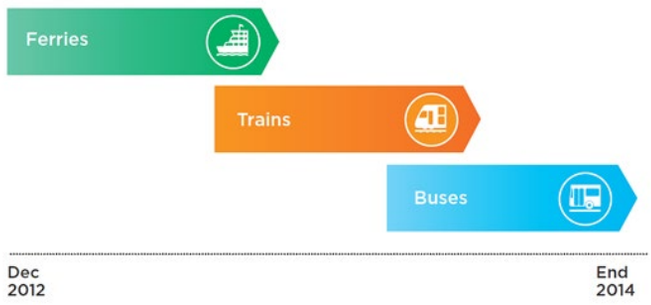
All parts of this question refer to the following information.

The opal card is a smartcard which will provide an easy, convenient and fast new way of travelling on the public transport network in the greater Sydney area. Instead of buying a paper ticket you load value onto your Opal card via a range of options to pay for your fare and you keep your card on a permanent basis.
When you tap on at an Opal card reader to start your journey, and tap off at the end of your journey, the system will automatically calculate your fare and deduct it from the value stored on your Opal card.
There will be four categories of Opal card. Currently available are The Adult Opal card (for customers 16 year of age and over who normally pay full fares) and the Child/Youth Opal card (for children and full time secondary students). An Opal card for Seniors/Pensioners and a Concession Opal card are yet to be implemented.



The Opal card is being rolled out progressively across the transport network: trains, ferries, buses and light rail. The full implementation of the Opal card is complete across all Sydney Train services, NSW TrainLink Intercity services, and all Sydney Ferries services. The new ticketing system is now being rolled out progressively across the bus network.

The progressive rollout of the Opal card:



a. Identify the purpose of this Opal card information system. **2 marks**

b. Identify and contrast participants and users for this information system. **3 marks**

c. Discuss factors of feasibility that would have been considered before proceeding with the development of this information system. **4 marks**

d. Identify the method of implementation that is being used to roll-out the Opal card information system. Discuss advantages and disadvantages of using this method of implementing the Opal card system. **4 marks**

e. Discuss social and ethical issues relevant to this Opal card information system. **4 marks**

END OF PAPER

Answers – 2015 IPT - Preliminary Course YEARLY EXAM

Multiple Choice :

Question:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	D	A	D	B	B	D	A	C	D	A	C	B	D	A	D

QUESTION 16 [14 marks]

a. *Define each of the following terms related to information systems.* ***5 marks***

(i) Data
(ii) Information
(iii) Participant
(iv) Environment
(v) Information technology

(i) Data – raw facts, the raw material used as input to subsequent information processes

(ii) Information – data that has been processed or interpreted into a useful form, the output displayed by an information system

(iii) Participant – someone who carries out the information processes within an information system

(iv) Environment - everything that influences and is influenced by the information system

(v) Information Technology - hardware and software used in the information processes associated with a particular information system

b. *In terms of the organising and the storing/retrieving information processes describe the difference between characters represented as images and characters represented using ASCII.* ***3 marks***

When text characters are stored in ASCII format, each character is represented by its unique 8 bit code (as determined by the ASCII table). So, for example, the letter 'A' is stored as 0100 0001. This means that subsequent processes such as spell check or formatting of the text can be performed easily using appropriate (word-processing) software.

Characters represented as images (such as produced by scanning a page of printed text) are represented as a bit map of the shape of the letter. In that form, spell check or formatting of the text cannot be performed as individual characters are not recognized.

c. *In terms of the collecting and the organising information processes describe the difference between data entry using a keyboard and data entry using optical character recognition (OCR).* ***3 marks***

Keyboard entry of characters occurs when the depressing of a particular key on the keyboard closes a unique set of switches causing the transmission of a unique code representing that keypress to be sent to the CPU. The data subsequently collected is in ASCII format and so can be easily processed (spellchecked, formatted…) by a word-processor.

OCR (Optical Character Recognition) is used on a scanned bitmap from a scanned page of text. By isolating each individual character shape and identifying the curves, gaps and corners on that shape it is possible to match the shape characteristics with the full set of characters stored. The shape can then be translated to its equivalent ASCII value, meaning that the generated text can subsequently be processed by a word-processor

d. *In terms of the processing information process describe the effects of and the difference between increased clock speeds and increased bus capacity when upgrading a computer.*

3 marks

Increased clock speed means that more machine code instructions can be executed in the same time interval, leading to a potential increase in performance by the CPU.

An increase in bus capacity means that more data can be transmitted internally inside the CPU between its components at the same time, effectively delivering more bits for processing at the same time. This means that there is reduced need for multiple accesses to the data required to complete an instruction, again resulting in potential increase in performance by the CPU

QUESTION 17 [7 marks]

a. *Identify the essential information technology required to operate an interactive whiteboard.*

3 marks

An IWB is connected to a laptop or computer by a USB cable (or wireless connection) so that it can accept touch inputs from its screen and transmit these to the CPU for processing

The touch inputs can be detected by 1 of 3 technologies:

Infrared: a grid of rays shone across the surface is interrupted by the presence of the 'writing' tool, and the relevant coordinates are identified and transmitted to the CPU

Resistive: a membrane stretched over the surface deforms under pressure to make contact with a conducting backplate, closing a circuit at that point

The coordinates of the touch are then sent to the CPU where the subsequent action is performed.

Capacitive / electromagnetic pen : This requires a pen with a special embedded circuit in its tip, which changes the voltage pattern across the screen. By determining the nature of the changed voltage pattern, the coordinates of the touch can be determined

Regardless of the type, the required cabling is the same.

A VGA (visual graphics array) cable is used to transmit the graphical information to be displayed from the frame buffer of the computer to the data projector, which then shines the image onto the Interactive Whiteboard Screen.

b. *Discuss how information can be displayed effectively to those with different degrees of visual impairment.* ***4 marks***

There are a large number of ways that interfaces can be designed to make them more accessible to the visually impaired:

- Offer a choice to the user to make the text a larger size
- Use a screen reader that is activated on mouse-rollover to convert text to spoken text

  When a screen-reader encounters an image, it will say "graphic" or "image" and then read the image's alternative ("alt") text. If a graphic doesn't have alt text, the screen-reader will skip it

  Therefore, websites should include alternative text for all informative graphics

  For graphics that are merely decorative, the alt text should be very brief or omitted altogether
- Choose colours for background and text that are sufficiently contrasting, and yet still complementary
- Choose colours for background and text that are distinguishable by people with different forms of colour blindness
- Use keyboard shortcuts rather than relying on the user having to locate and read a menu or having to locate navigation buttons
- Offer large buttons with clear unambiguous text labels

QUESTION 18 [17 marks]

a. *Identify the purpose of this Opal card information system.* ***2 marks***

The Opal card system provides a new electronic method of ticketing and paying for transport in the greater Sydney region.

b. *Identify and contrast participants and users for this information system.* ***3 marks***

Participants are those who carry out the information processes within a system while users make use of the information output by the system. The participants in this system are those who use the Opal card system (the technology) to either top-up their money on their card, or tap / swipe their card to register a trip. The users are those who make use of the data in the system, such as transport management staff who wish to use the data to look at passenger use of various transport options. The users can become participants when they enter data into the system by swiping their cards at Opal card readers and by loading credit on to the cards.

c. *Discuss factors of feasibility that would have been considered before proceeding with the development of this information system.* ***4 marks***

Technical feasibility would have considered whether the necessary technology was available or needed to be developed. This includes the hardware (the Opal card readers and the technology required to top up the amount on the cards) and the software needed to manage the system and ensure that it functions as required.

Operational feasibility would have considered the skills of the participants, and whether they will be able to interact with the proposed system. In this case, it is important that members of the public can use the technology easily, either to tap for a journey, or to navigate the website to top up their card

Economic feasibility would consider the costs and risks of developing the new system and also the costs and risks of not developing the new system. A cost-benefit analysis of the Opal card system would have been carried out to ensure that the overall benefits of the proposed system are worth the costs of developing, installing and maintaining it.

Schedule feasibility would consider the time frame needed for development, to ensure that the new system can be developed and installed in a time-frame acceptable to the government.

At the conclusion of the feasibility study a decision would have been made whether or not to proceed with the development in its proposed format, or whether modifications to the proposed system need to be considered

d. *Identify the method of implementation that is being used to roll-out the Opal card information system. Discuss advantages and disadvantages of using this method of implementing the Opal card system.* ***4 marks***

The method of implementation described is phased implementation. Implementation occurs in sections. In this case, we assume that the different sections of the transport system require a separate software process for the processing of the Opal Card. From the article we see that a number of separate transport systems have so far had the Opal card implemented. As the implementation of each stage is completed, the next section is implemented.

Advantages:

- The implementation occurs in modules allowing all problems in the current module to be solved step by step before starting the next module. In this way, each section is fully tested before proceeding to the next section.
- The total implementation is broken into manageable sections which could lead to fewer errors.
- For the Transport department, it is easier to deal with issues as they arise as they are limited to the newly implemented stage
- If a newly implemented stage fails, it is relatively simple to fall back to the previously successfully implemented phases.

Disadvantages:

- There can be confusion for members of the public. For example, travellers could be confused when using an unfamiliar form of transport as to whether to buy paper tickets or use their Opal card
- Implementation of the complete system, and therefore realisation of the full benefits of the system, takes a longer time than if were installed all at once over all possible modes of transport at the same time

e. *Discuss social and ethical issues relevant to this Opal card information system.* ***4 marks***

Issues that could be discussed include:

- Equity - education of the travelling public in the correct use of the Opal card . How do we deliver the training and who has access to it
- Work health and safety – are the Opal card readers in a safe spot, protected from moving transport and traffic
- Privacy - Need for security of personal information, such as who is travelling where and at what times of the day
- Quality /Accuracy of data – the list of fares need to be correct and current, scanning of start and end trip times must be accurate, calculation of fares must be correct, passengers must be able to top-up their cards conveniently and quickly
- Security - What happens if a fully loaded Opal card is lost or stolen – can the credit be stopped/refunded
- Equity - Availability for pensioners and elderly. What support do they have if they experience difficulty using the card?
- Changing nature of work – drivers/operators and passengers would need training
- Redundancies in ticket sellers, new jobs for technicians maintaining the Opal card readers

END OF PAPER