



CATHOLIC SECONDARY SCHOOLS
ASSOCIATION OF NEW SOUTH WALES

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Centre Number

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Student Number

2007
TRIAL HIGHER SCHOOL CERTIFICATE
EXAMINATION

Information Processes and Technology

Afternoon Session
Monday 6 August 2007

General Instructions

- Reading time – 5 minutes
- Working time – 3 hours
- Write using blue or black pen
- Draw diagrams using pencil
- Write your Centre Number and Student Number on this page

Total marks – 100

Section I

Pages 2–7

20 marks

- Attempt Questions 1–20
- Allow about 40 minutes for this section

Section II

Pages 8– 10

40 marks

- Attempt Questions 21– 24
- Allow about 1 hour and 10 minutes for this section

Section III

Pages 11– 15

40 marks

- Attempt TWO questions from Questions 25–28
- Allow about 1 hour and 10 minutes for this section

Disclaimer

Every effort has been made to prepare these 'Trial' Higher School Certificate Examinations in accordance with the Board of Studies documents, *Principles for Setting HSC Examinations in a Standards-Referenced Framework* (BOS Bulletin, Vol 8, No 9, Nov/Dec 1999), and *Principles for Developing Marking Guidelines Examinations in a Standards Referenced Framework* (BOS Bulletin, Vol 9, No 3, May 2000). No guarantee or warranty is made or implied that the 'Trial' Examination papers mirror in every respect the actual HSC Examination question paper in any or all courses to be examined. These papers do not constitute 'advice' nor can they be construed as authoritative interpretations of Board of Studies intentions. The CSSA accepts no liability for any reliance use or purpose related to these 'Trial' question papers. Advice on HSC examination issues is only to be obtained from the NSW Board of Studies.

2601-1

Section I

20 marks

Attempt Questions 1-20

Allow about 40 minutes for this section

Use the Multiple Choice Answer Sheet provided

- 1 In system development who is the person responsible for resolving conflicts amongst team members?
- (A) Systems analyst
 - (B) Client
 - (C) Programmer
 - (D) Technician
- 2 An insurance company has 2 bus networks setup on different floors. They need to share data between them and have been communicating via Emails or secondary storage media. The technician suggests that they link the 2 networks. What will the technician need to use to connect the LANs?
- (A) Hub
 - (B) Bridge
 - (C) Router
 - (D) Switch

- 3 Which of the following has been labeled correctly?

<http://www.cssa.nsw.edu.au/exams/ipt.htm>

(i) (ii) (iii) (iv) (v) (vi)

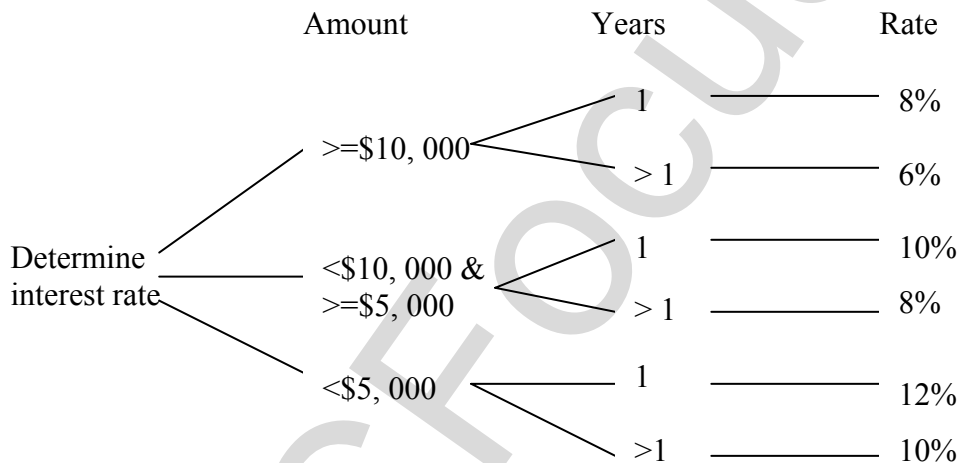
- (A) (i) protocol, (ii) world wide web, (iii) domain name, (iv) Australia, (v) directory, (vi) file
- (B) (i) protocol, (ii) world wide web, (iii) file, (iv) Australia, (v) directory, (vi) domain name
- (C) (i) protocol, (ii) world wide web, (iii) domain name, (iv) Australia, (v) file, (vi) directory
- (D) (i) domain name, (ii) world wide web, (iii) protocol, (iv) Australia, (v) directory, (vi) file

- 4 Data warehousing is used to cater for which of the following?
- (A) It is a process that looks for patterns in data
 - (B) To temporarily store data that is waiting to be processed
 - (C) Collecting information from a number of sources to help create a relational database
 - (D) Accessing and analysing data so that it can be used to help organisations make decisions

- 5 Which cable suffers the least amount of electromagnetic interference?

- (A) Fibre optic
- (B) Coaxial cable
- (C) Twisted pair
- (D) Untwisted pair

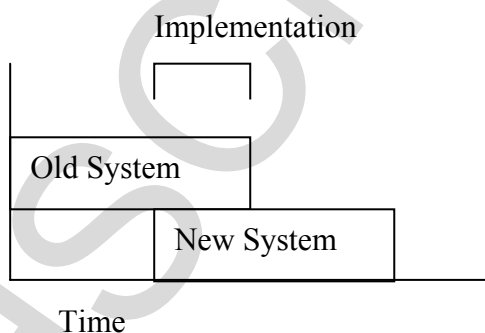
Use the following diagram to answer questions 6 and 7.



- 6 What is the name of the modelling tool shown above?

- (A) decision table
- (B) decision tree
- (C) data tree diagram
- (D) data flow diagram

- 7 Grant wants to borrow \$5,000 for 2 years. What interest rate would the loan incur?
- (A) 6
 (B) 8
 (C) 10
 (D) 12
- 8 It is often said that programmers and system analysts use the top down approach when designing a solution. What does this mean?
- (A) It means using the system development cycle as it occurs in stages
 (B) It uses system development cycle step by step with no overlapping stages
 (C) An existing solution is broken down into smaller components and once it can not be broken down further, it is solved and they are brought together.
 (D) A large problem is broken down into smaller, easier to solve problems and once each small problem is solved individually they are brought together.
- 9 In a ring network, the collision prevention method used is token passing. What does a token comprise?
- (A) A password
 (B) A random number
 (C) A string of bits
 (D) A number of characters
- 10 Which method of implementation is being illustrated in the diagram shown below?



- (A) direct
 (B) pilot
 (C) phased
 (D) parallel

- 11** What are the common settings for asynchronous transmission?
- (A) 8 data bits, no parity, 1 stop bit
 - (B) 8 data bits, odd parity, 1 stop bit
 - (C) 7 data bits, even parity, 0 stop bits
 - (D) 7 data bits, 1 parity bit(odd or even), 1 stop bit
- 12** When preparing a project plan, the systems analyst must make sure that all participants understand the need for which of the following?
- (A) project goals, deliverables and schedules
 - (B) modeling charts, timelines and resources
 - (C) meetings, cost and create an electronic calendar
 - (D) deliverables, resources and a training manual
- 13** What is conflict resolution?
- (A) It involves discussing an issue and arriving at a consensus.
 - (B) It involves restating, reflecting and summarising the speaker's ideas and feelings.
 - (C) It involves a discussion between employees in order to solve arguments and disputes.
 - (D) It involves careful preparation of a list of questions should be prepared and discussed in a meeting with a clear purpose
- 14** Electrical interference, or noise, can corrupt data being transferred electronically. When data is being transferred in data packets, data corruption can be best detected by the use of
- (A) parity checking
 - (B) full duplex checking
 - (C) cyclic redundancy checks
 - (D) symbol substitution checks

Use the database below to answer questions 15, 16 and 17:

LetsFixEm

Surname	First name	Car type	Model	Rego No	Repair cost
Anderson	Leah	Sedan	Holden	RBE – 924	\$320.00
Carson	Andrew	4WD	Toyota	WEA – 891	\$65.00
Garison	George	Sedan	Ford	TRE – 098	\$200.00
Harris	Rita	Van	Toyota	PLO – 001	\$95.00

- 15 If Repair cost was sorted in descending order. What would be the Rego No of the second record?
- (A) RBE – 924
(B) WEA – 891
(C) TRE – 098
(D) PLO – 001
- 16 If you did a search with ?o*d* on car Models, what would be the result/s?
- (A) Holden
(B) Ford
(C) Ford and Toyota
(D) Holden and Ford
- 17 Which of the following would find full names of customers who own a sedan and have repair costs that exceed \$200?
- (A) SELECT Repair cost > \$200 AND Car type = sedan FROM LetsFixEm
(B) SELECT First name, car type FROM LetsFixEm WHERE Repair cost < \$200
(C) SELECT Surname First name FROM LetsFixEm WHERE Repair cost > \$200 AND Car = sedan
(D) SELECT Surname, First name FROM LetsFixEm WHERE Repair cost > \$200 AND Car Type = sedan
- 18 The main disadvantage of using microwave as a transmission medium is which of the following?
- (A) it is adversely affected by wet weather.
(B) it id adversely affected by dust and snow.
(C) it can only transmit in straight lines.
(D) it can only transmit a very narrow bandwidth.

19 Which modelling tool uses  to represent a document?

- (A) A flowchart
- (B) A system flowchart
- (C) A data flow diagram
- (D) An organisational chart

20 An Ethernet is a LAN access method with which of the following properties?

- (A) It is based on a bus network and allows transmission of data in both directions
- (B) It is based on a ring network and allows transmission of data in both directions
- (C) It is based on a star network and allows transmission of data in both directions
- (D) It is based on a ring network and allows transmission of data in one direction only

Section II

Total marks (40)

Attempt Questions 21 – 24

Answer each section in a SEPARATE writing booklet.

If you include diagrams in your answer make sure they are clearly labelled.

	Marks
Question 21 (10 marks) Use a SEPARATE writing booklet.	
(a) (i) Identify the tasks undertaken during system implementation.	1
(ii) Discuss a method of participant training and any support that could be used in this stage to assist users of the systems development cycle.	2
(b) Bartholomew Notta is a mortgage broker. His job requires him to organize home loans for his clients. He requires a computer based system to streamline his business. He has hired you to develop the system for him. He has discussed his requirements with you. He would like to collect client details in person to input into his system. He would like the system to match his client's loan requirements against a database to check the client's credit rating. This information is checked against a database of available loans. The output of this system would be the most appropriate loan to meet his client's needs.	
(i) Construct a data flow diagram (DFD) to assist you in designing the proposed system.	3
(ii) Describe how a prototype can be used in introducing a new system for Mr Notta and evaluate its potential in assisting the development of a new system.	4

Question 22 (10 marks) Use a separate writing booklet

- (a) Define 2
- Distributed database
 - Metadata
- (b) Henry requires an information system to store information about his DVD collection. He would like to be able to search for a DVD from his collection based on title, actors, director and rating. He would also like the database to store information about his favourite movies, directors and stars, such as date of birth and country of origin.
- (i) Propose and justify the most appropriate computer based method of organising this data. 2
- (ii) Recommend appropriate software to develop Henry's information system. 2
- (c) On-line storage is being increasingly used for personal file storage, software file hosting and a variety of other applications. Analyse the issues related to on-line storage, including ownership, accuracy, security and privacy. 4

Question 23 (10 marks) Use a separate writing booklet

- (a) Letsread is a library that is expanding, it is adding a multilingual section with books, newspapers, magazines and computers for Internet use. The old section of the library is running on a ring network and the new section is running on a star network. Management has decided to connect the two LANs.
- (i) Draw a diagram showing a connected star and a ring network. 2
- (ii) The two LANs use different protocols. Which device would you use to join the two networks? Justify your choice. 2
- (b) The library also has a website that allows users to purchase e-books (electronic books) on-line. Users pay by credit card and the e-book is sent to the Email address of their choice.
- (i) Describe the information technology required by the library to run this system successfully. 2
- (ii) Explain how this service effects the use of the traditional library system. Give advantages and disadvantages. 4

Question 24 (10 marks) Use a separate writing booklet

- (a) What is the difference between a flat file database and a relational database? **2**
- (b) A shipping company has a flat file database with the following fields:
customer_name, customer_address, customer_id, date_of_order, order,
order_number, product_description, product_id, selling_price, quantity_in_stock
and total_cost.
- (i) What would the following search find? **1**

date_of_order < 1/01/2007 AND quantity_in_stock <> 0
- (ii) Create a data dictionary for the fields in the database. **3**
- (iii) Normalise the database. **4**

Section III
Total marks (40)

Attempt TWO questions from Questions 25 – 28
Allow about 1 hour and 10 minutes for this section

Answer each section in a SEPARATE writing booklet. If you include diagrams in your answer make sure they are clearly labelled.

	Marks
Question 25 – Transaction Processing Systems (20 marks)	
(a) Explain the grandfather-father-son backup procedure.	2
(b) ITComp Pty Ltd receives cheques for purchases made by customers. These cheques are deposited at the company’s local ABC Bank branch, which batch processes the cheques to deposit the money into ITComp’s bank account.	
(i) Recorded on cheques is a MICR, describe what the MICR is?	2
(ii) Discuss ONE (1) disadvantage of batch transaction processing.	2
(c) AusJet Pty Ltd is a new domestic airline in Australia based at Sydney airport and has many daily flights flying to all capital cities. Electronic tickets (e-tickets) can be purchased online and printed by the customer or through a travel agency. AusJet uses a real-time transaction processing system to process the online booking website with a linked online database to produce the e-tickets.	
(i) Define the term ‘real-time processing’.	2
(ii) Outline ONE (1) advantage of real-time transaction processing.	2
The e-tickets include data such as the passenger’s name, date and time of flight, flight number, and booking code details. The e-ticket is used in order for passengers to check-in at the airport.	
(iii) Identify the purpose, participants, data/information, and information technology used in this transaction processing system.	4
(iv) Critically analyse the ethical, technical, and social issues that arise from using this e-ticket booking system	6

Question 26 – Decision Support Systems (20 marks)

- (a) (i) Define the term *certainty factor* and provide an example. 3
- (ii) Describe a *neural network*, using an example. 3
- (b) Super Don’s Family Restaurant is in the early stages of developing a Decision Support System for payment of staff based upon a spreadsheet. (Shown below).

	A	B	C	D
1	Super Don's Family Restaurant			
2				
3	Pay Rate:	\$ 10.00	per hour	
4				
5	Firstname	Surname	Hours Worked per week	Gross Pay
6	Peter	Nut	10	\$ 100.00
7	Dorothy	Com	8	\$ 80.00
8	Catherine	Breeze	12	\$ 120.00
9	Jake	Headstrong	5	\$ 50.00
10				
11				

- (i) Use the spreadsheet shown to explain the difference between an absolute and relative cell reference. 3
- (ii) Explain how macros can be used in spreadsheets. 3

Question 26 continues on page 13

Question 26 (continued)

- (c) A Decision Support System, (DSS) is used to identify different types of sailing ships. Users are presented with choices relating to different characteristics of ships. For example, the user is asked “how many masts does the ship have?” Depending on the response of the user they may be asked; “how many foresails does the ship have?” Ships are categorised into three different categories according to the number of masts that they have. The categories are:

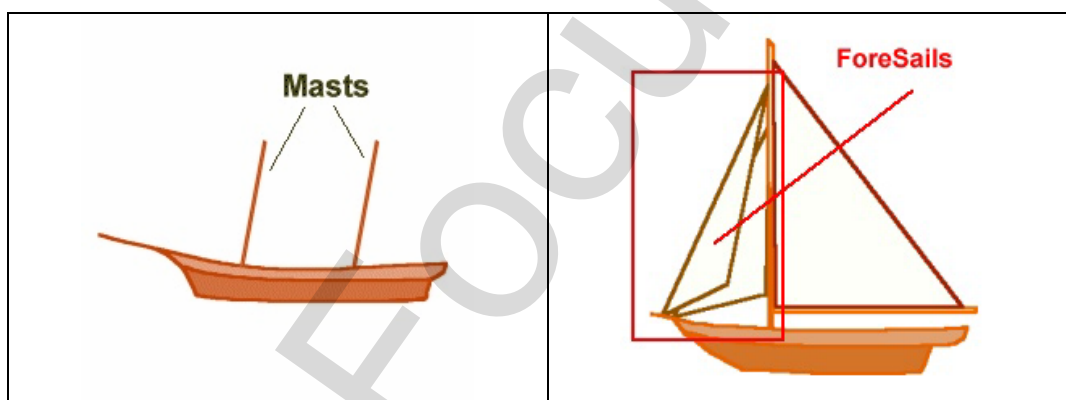
- Ships with 1 mast,
- Ships with 2 masts
- Ships with 3 or more masts

Note: a ship can have square or triangular foresails. In this question we will categorise ships with triangular sails only.

Ships with one mast and one foresail is called a sloop, whereas if it has 2 or more foresails it is called a cutter.

Ships with 2 masts can be called a schooner or a ketch.

Ships with 3 or more masts are called staysail schooners.



- (i) Construct a decision tree for the given scenario. 3
- (ii) Critically evaluate the choice of an expert system, rather than a database, for this Decision Support System in terms of the information processes of; 5
- Organising
 - Analysing
 - Processing

<http://www.mcgoo.com.au/html/es-builder.htm>

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End of Question 26

Question 27 – Automated Manufacturing Systems (20 marks)

- (a) (i) Describe Computer Integrated Manufacturing using an example. **3**
- (ii) Use examples to distinguish between *underdamping* and *overdamping* in automated manufacturing systems. **3**

- (b) Nick's Fruit Cannery prepares and packages fruit into cans. Different fruit is processed each week, for example peaches one week then pineapple the next week.

The fruit cannery can have all its processes described by the following steps;

- Wash fruit and peel the fruit
- Wash the cans
- Add peeled fruit to a clean can
- Seal and sterilise the canned fruit
- Add a label to the can and pack it for shipping

Marina is one of the workers who washes and peels the fruit. A conveyor belt then moves the fruit and cans between various processes. Machines wash the cans, add the fruit to a can, seal and sterilise the canned fruit and add the label to the can. The fruit is sterilised by boiling the fruit in the can and spot welding the lid to the can before it cools down. Aaron is one of the workers who currently has the job of lifting the cans off the conveyor belt and packing them into cartons.

- (i) Draw a Block Diagram of the fruit cannery system. Clearly showing Human centered and machine centred processes. **4**
- (ii) Identify the technologies required at Nick's Fruit cannery and describe how they operate in the automated production of canned fruit. In your response consider;
- A suitable *Sensor*
 - A suitable *Actuator*
 - The reduction of *noise*
- (c) Nick's fruit cannery is a semi-automated manufacturing system, operating 24 hours per day, 7 days per week, located in a small country town with high unemployment. **6**

Describe what a semi-automated manufacturing system is and discuss the advantages and disadvantages for using a semi-automated manufacturing system at Nick's fruit cannery. In your response consider the following aspects;

- The health and safety of workers
- Production using machines and humans
- Quality Control
- The social effects on the community

Question 28 – Multi-media Systems (20 marks)

- (a) Describe ONE difference between the following terms in relation to multimedia:
- (i) Aspect ratio and resizing images. 2
 - (ii) Bit depth and resolution. 2
- (b) (i) Give an example of a multimedia system widely used on personal computers. 1
- (ii) Describe the skills of TWO different people in the design and production of the multimedia system you chose in part (i). 2
- (c) Digital Television is now available in most of NSW. Its widespread accessibility allows owners of Laptops to purchase, for a small amount, a portable TV antenna that plugs into their USB drive making digital TV available on their laptops.
- (i) One laptop owner made the comment that "...TV is now so much clearer on my laptop than on my TV in the lounge room". Explain why this comment was made. 2
 - (ii) Give TWO examples of how a typical laptop owner might benefit from digital TV. 2
 - (iii) Digital TV is compressed using the MPEG format. Explain why compression is needed and how it increases the available services that an end user experiences while watching Digital TV. 3
 - (iv) Digital TV introduces new copyright issues that were not present with the older analogue TV. Describe TWO examples. 2
 - (v) A laptop user named Sally notices that her hard disk has a total size of 40Gigabytes and 35Gigabytes are already used. She would like to record a 100min digital TV broadcast which is screened during the day to watch later that evening. Since Sally is only interested in the audio part of the broadcast she is able to turn off the recording of the video and only record audio. The recording software also allows the audio to be recorded using the following specifications: 4
 - Stereo Sound.
 - Sample rate of 40 000 bits per second.
 - Sample size of 10 bits.

Find how much hard disk space is needed to record the audio broadcast and whether it will fit in the remaining space on Sally's laptop. (Show working)

EXAMINERS

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Heather Jesuadian	Aquinas College, Menai
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