



CATHOLIC SECONDARY SCHOOLS  
ASSOCIATION OF NEW SOUTH WALES

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Centre Number

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Student Number

**2006**  
**TRIAL HIGHER SCHOOL CERTIFICATE**  
**EXAMINATION**

# Information Processes and Technology

Morning Session  
Thursday 3 August 2006

## 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 2-8

**20 marks**

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

### Section II

Pages 9-12

**40 marks**

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

### Section III

Pages 13-17

**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.

**2301-1**

## **EXAMINERS**

Zoe Petrovich (convenor)	La Salle Catholic College, Bankstown
Andrew Clucas	Northern Beaches Christian School
Darren Payne	Hurlstone Agricultural High School, Hurlstone
Heather Jesuadian	Aquinas College, Menai
Sam Russoniello	Duval High School, Armidale

## Section I

**20 marks**

**Attempt Questions 1-20**

**Allow about 40 minutes for this section**

Use the Multiple Choice Answer Sheet provided

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- 1** A system analyst needs to use a modeling tool to represent an entire information system. The system can be shown as a single process along with the inputs and outputs to the system. Which modeling tool would the analyst use?

  - (A) System flowchart
  - (B) Context diagram
  - (C) Data flow diagram
  - (D) Data dictionary
- 2** A security measure that can be used to prevent unauthorised personnel from viewing the contents of a document works by scrambling the data making it unreadable to any user who does not have a program that can make the data readable. What is the name of this security measure?

  - (A) Firewall
  - (B) Virus detector
  - (C) Hacker alert
  - (D) Encryption
- 3** How long will it take to transmit the contents of a booklet that is 10 kilobytes in size via modem at 2400 bps?

  - (A) approximately 34 seconds
  - (B) approximately 34 minutes
  - (C) approximately 43 seconds
  - (D) approximately 43 minutes

- 4 The SQL statement shown below would display which of the following?

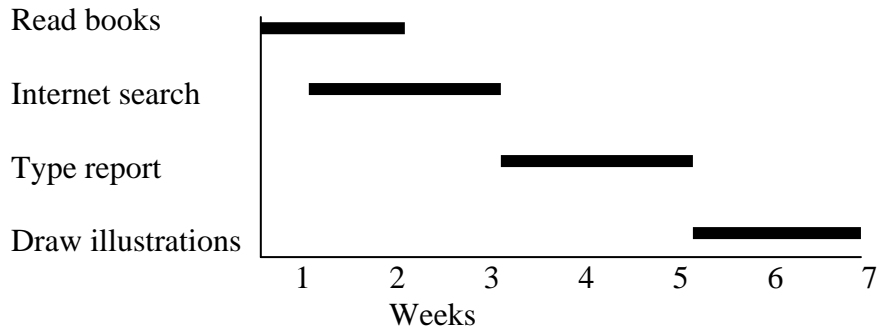
```
SELECT Surname, wages  
FROM Staff  
WHERE wages <> $500.00  
ORDERBY Surname DESC
```

- (A) All surnames in descending order of staff with wages equal to \$500.00
  - (B) All wages in descending order of all staff earning greater than \$500.00
  - (C) All surnames in descending order of staff with all wages other than \$500.00
  - (D) All surnames and wages in descending order of staff with wages less than and greater than \$500.00
- 5 When converting from one computer-based system to another, management decides to get employees to use both systems simultaneously until it is clear that the new system is working satisfactorily. What is this method of conversion?
- (A) direct
  - (B) pilot
  - (C) phased
  - (D) parallel
- 6 Which of the following items would be considered as a deliverable?
- (A) training manual, chart and a dictionary
  - (B) budget, computer hardware and data dictionary
  - (C) program, analysis report and cleaning products
  - (D) program, analysis report and a data dictionary
- 7 Which of the following issues best describes the right of all users to have access to information?
- (A) Ethics
  - (B) Equity
  - (C) Copyright
  - (D) Bias

- 8 A driving school uses a database for bookings with instructor ID, client details, booking time and date. The instructor ID is an attribute that is a primary key in another table. What type of key is it called?
- (A) single
  - (B) primary
  - (C) foreign
  - (D) secondary
- 9 Why is evaluation an important stage in system development?
- (A) To determine whether the budget will be able to support the new system
  - (B) To determine whether the management is satisfied with the new system
  - (C) To determine whether the original aims and objectives have been met
  - (D) All of the above
- 10 The following search is performed on a database W\*n?dy\*. Which of the following would result from the search?
- (A) Wendy
  - (B) Wendyl
  - (C) Wordayle
  - (D) Wearnodyse
- 11 How does the CSMA/CD protocol work to prevent collisions in a bus network?
- (A) When a node needs to transmit data, it checks the bus to detect whether or not it is in use and if it is clear it transmits the data. If a collision occurs, both nodes stop transmitting and wait a random amount of time and re-transmit.
  - (B) When a node needs to transmit data, it checks to the cable to detect whether or not it is in use and if it is clear it transmits the data. If a collision occurs, both nodes stop transmitting and do not re-transmit.
  - (C) When a node needs to transmit data, it checks to the bus to detect whether or not it is in tact and if it is making a sound it transmits the data. If a collision occurs, both nodes stop transmitting and wait a random amount of time and re-transmit.
  - (D) When a node needs to transmit data, it checks to the bus to detect whether or not it is in use and if it is clear it transmits the data. If a collision occurs, both nodes stop transmitting and immediately re-transmit.

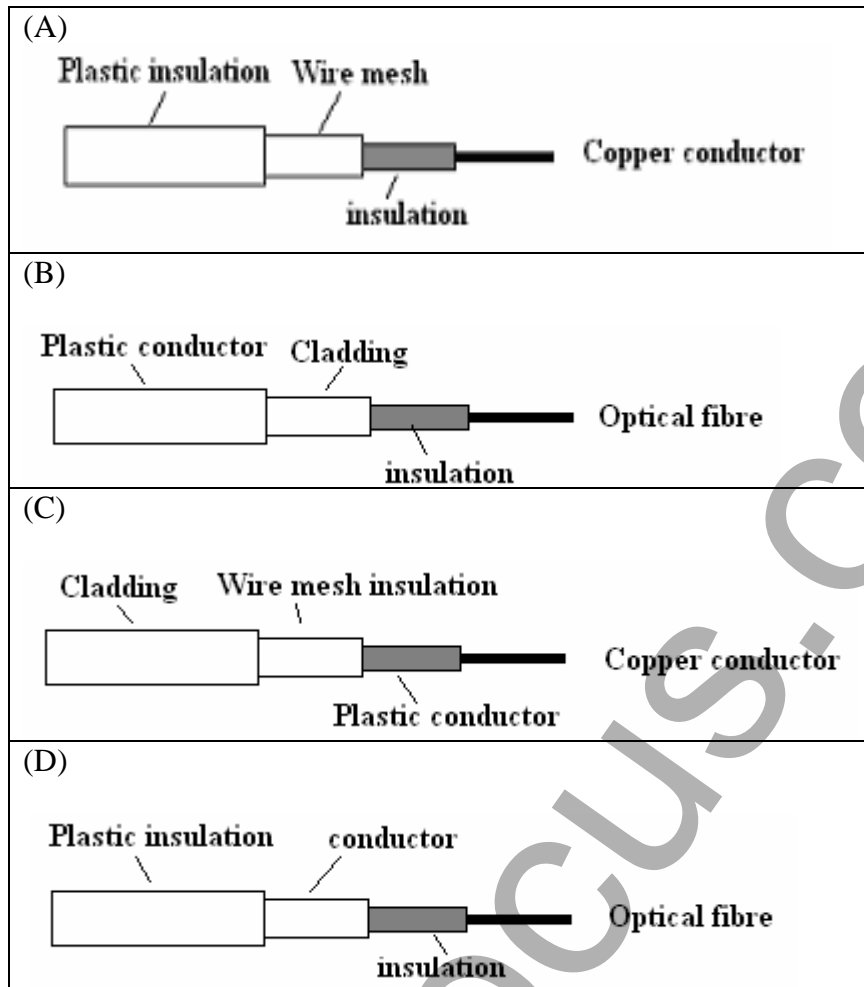
- 12** A system analyst working on a project hires a programmer. What would be the most likely reason for this?
- (A) To train staff on how to use a programming language
  - (B) To upgrade the RAM on all of the existing computers
  - (C) To create a custom made program for the company
  - (D) To decipher the technical information that came with their pre-existing software
- 13** Which of the following storage media would need to be accessed sequentially?
- (A) Optical disc
  - (B) Magnetic tape
  - (C) Hard disc
  - (D) Optical tape
- 14** Which of the following would be referred to as the most common settings for asynchronous transmission?
- (A) 7 data bytes, no parity bit, 0 stop bits
  - (B) 8 data bytes, 1 parity bit (odd or even), 1 stop bit
  - (C) 8 data bits, 1 parity bit (odd or even), 1 stop bit
  - (D) 7 data bits, 1 parity bit (odd or even), 1 stop bit

Use this diagram to answer questions 15 and 16.



- 15** What is the name of the modelling tool shown above?
- (A) Decision chart
  - (B) Line chart
  - (C) Time chart
  - (D) Gantt chart
- 16** According the chart. How long did it take to complete the search?
- (A) 4 weeks
  - (B) 3 weeks
  - (C) 2 weeks
  - (D) 1 week

17 Which of the following diagrams shows a correctly labelled coaxial cable?



18 Which of the following would be described as a connecting device that contains software enabling it to transmit data to a specific node?

- (A) hub
- (B) switch
- (C) repeater
- (D) emulator

19 Which of the following occurs in the design stage of the system development cycle?

- (A) Hardware and software are installed
- (B) A prototype of the system is created
- (C) Hardware and software are purchased
- (D) The existing system is investigated and a report is written



**20** Which of the following best describes HTML?

- (A) HTML documents are text files which include instructions that show how a web page will be displayed and navigated.
- (B) HTML documents are programming language files with pre-set pages and objects that can be displayed on a web page.
- (C) HTML documents are a set of drawing tools used to create web pages for businesses.
- (D) HTML documents are special files that include instructions on appearance, editing and modeling tools.

## Section II

**40 marks**

**Attempt Questions 21-24**

**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.

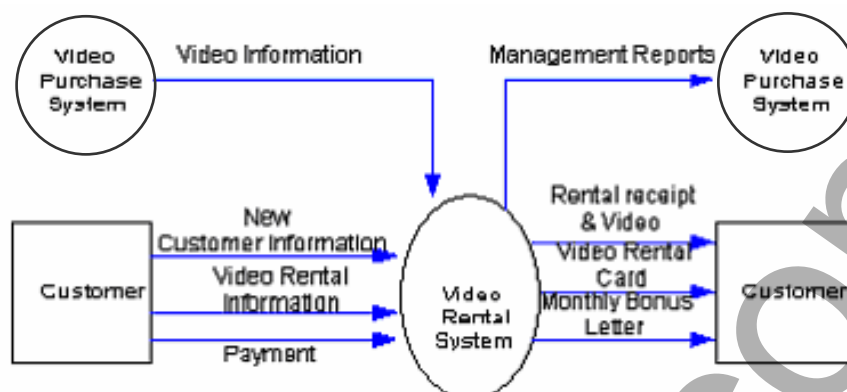
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<b>Question 21</b> (10 marks) Use a SEPARATE writing booklet.		<b>Marks</b>
(a)	A system analyst has developed a management plan which incorporates a variety of communication strategies.  Contrast conflict resolution and negotiation skills.	<b>2</b>
(b)	A feasibility study is the main task completed during the making decision stage of system development. A feasibility report is the deliverable report which details benefits, costs and risks associated with a project.  Describe how a project can be assessed in terms of technical feasibility.	<b>3</b>
(c)	Ashton Electronics is a medium sized manufacturer and retail operation with three outlets across Victoria and a head office in Melbourne. The company has decided to expand and the feasibility study shows expansion would best be achieved by establishing an on-line store (e-commerce outlet).  Discuss TWO social and/or ethical issues the management of Ashton Electronics will need to consider as they setup their new on-line store.	<b>5</b>

**Question 22** (10 marks) Use a SEPARATE writing booklet.

**Marks**

Consider the following context diagram.



- (a) Explain why some of the items in boxes are duplicated. 2
- (b) Using an example describe the process of normalisation as it applies to the development of a database system. 4

(c)

Author	Title	Australian	Cost	Year	Number
Shankes, Willis	Much Ado	No	\$20.00	1964	822.3 SHA
Shankes, Willis	Bretheran	No	\$25.00	1963	822.33 SHA
Griss, Ben	Courts	Yes	\$40.00	1970	942.125 GRI
Griss, Ben	The World	Yes	\$20.00	1975	942.126 GRI
McCall, Wayne	World War I	No	\$25.00	1976	943.085 MCC
Smith, Joy	Aussie Tales	Yes	\$40.00	1980	943.085 SMI
Simpson, Jack	Let's Compute	Yes	\$30.00	2000	450.123 SIM
Liliton, Ann	Working with IT	No	\$20.00	2000	450.100 LIL
Sums, Gill	Databases Are Fun	Yes	\$25.00	1998	450.34 SUM

- (i) In the database table below. Which field would you recommend for use as a primary key? Justify your choice. 1
- (ii) Construct a data dictionary for the database table. 3

**Question 23** (10 marks) Use a SEPARATE writing booklet.

**Marks**

www.getbookinfo.com is a web based company that offers a non-interactive website service. It specialises in retrieving information about books for any website. Any webpage on the internet can utilise this service by creating hyperlinks to the getbookinfo website containing the book name and the data which is to be seen.

The getbookinfo website is powered by a web based Database. All the data which is returned is stored in a table whose fields are as follows:

book	author	URL	price	image
------	--------	-----	-------	-------

Consider the following which is the destination address from a hyperlink on a webpage:  
<http://www.getbookinfo.com?book=The-DaVinci-Code&show=book,price,URL&order=price-desc>

This example returns a webpage whose main elements look like the following:

book	price	URL
The Da Vinci Code	\$24.90	<a href="http://www.buybooksonline.net">http://www.buybooksonline.net</a>
The Da Vinci Code	\$24	<a href="http://www.cheaperbooks.com">http://www.cheaperbooks.com</a>
The Da Vinci Code	\$21.50	<a href="http://www.paperbackwriters.com">http://www.paperbackwriters.com</a>
The Da Vinci Code	\$11	<a href="http://www.ebay.com.au">http://www.ebay.com.au</a>

Any hyperlink can also use the wildcards: \* for any number of characters, and ? for any single character.

- (a) Define the following terms:
- (i) Hyperlink 1
  - (ii) URL 1
- (b) What would be the destination address from a hyperlink which returns the URL and price of the book “Pride and Prejudice”. The output must show the cheapest book first and the most expensive last. 2
- (c) What would be the destination address from a hyperlink which returns all the books in alphabetical order and their prices from the Harry Potter series? 2
- (d) Explain how the getbookinfo.com website makes money? 2
- (e) Explain why getbookinfo.com is a “non-interactive website”. 2

**Question 24** (10 marks) Use a SEPARATE writing booklet.

**Marks**

- (a) Network Operating Systems (NOS) have different features to a local desktop Operating System.
- (i) Name ONE feature which is specific to a NOS? **1**
- (ii) Give an example of the processes “analysing” and “transmitting” in relation to a NOS. **2**
- (b) Network administrators often have hundreds of desktop machines they need to deal with as well as Network Servers. Explain how a network administrator might deal with client installation and protocol assignment, when dealing with desktop machines. **2**
- (c) An advertising agency has a Local Area Network (LAN) with numerous components all functioning at the same time in order for it to work successfully.
- (i) Name TWO components used in a LAN. Explain why they need to be functioning in order for a LAN to work successfully. **2**
- (ii) The agency wants to upgrade from a metal transmission media (e.g UTP) to a Fibre Optic cable. In which case would this upgrade **NOT** improve the performance of a LAN? **3**

### Section III

**40 marks**

**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.

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**Question 25 – Transaction Processing Systems (20 marks)**

**Marks**

Use a SEPARATE writing booklet.

- |       |  |          |
|-------|--|----------|
| (a)   | What is MICR? Give an example.   | <b>2</b> |
| (b)   | Outline the procedures of grandfather, father, son as a method of backup.  | <b>3</b> |
| (c)   | <p>Roberta's cakes is a small business that supplies and delivers cakes. Roberta has decided to create a website to increase her profit margin.</p> <p>The website gives the customer a menu with prices and they can order by phone or Email. All orders are received and entered into a customer database and a stock database. The cakes are delivered with a printed invoice and the cakes are paid for on delivery.</p> |          |
| (i)   | Some customers prefer to pay by credit card. How can Roberta further enhance or modify her website to allow this?  | <b>3</b> |
| (ii)  | Discuss the security issues and any recommendations that need to be considered to make sure that the customer's information is kept secure.  | <b>3</b> |
| (iii) | The website is altered so that customers can register their details on-line and enter their order using a shopping cart. Once a customer has registered they only need to enter a password to access the site and place an order. Create a storyboard to show the layout of the website.   | <b>4</b> |
| (d)   | When paying by credit card, the transaction undergoes an ACID (Atomicity, Concurrency, Isolation and Durability) test. Outline each stage of the transaction using an ACID test.   | <b>5</b> |

**Question 26 – Decision Support Systems (20 marks)****Marks**

Use SEPARATE writing booklet.

- (a) (i) Define the term “neural network”. **2**
- (ii) Describe a situation in which a neural network would be used. **2**
- (b) A whale watching expert system asks the user questions such as:
- Is the whale's tail fin visible?
  - Is the dorsal fin visible? (The dorsal fin is the fin on the whale's back).
  - Would you consider the size of the whale to be *medium*?
- The user responds with Yes/No answers and the expert system identifies the type of whale the user has seen.
- (i) Explain why this is an example of forward chaining. **2**
- (ii) Expert systems usually consist of a number of components. With reference to the whale watching expert system explain the function of the knowledge base. **2**
- (iii) Describe the role of the expert and the knowledge engineer in creating this expert system. **2**

**Question 26 continues on page 15**

- (c) Robyn Banx wants to borrow some money from Empire Bank to buy a house. She has only been employed steadily for three months, but is on a good income. A bank officer from Empire bank uses a DSS (Decision Support System) to process her loan application of \$250,000. (See screenshot below). Based on the information provided by the DSS, he recommends that the loan be approved and his Manager gives final approval for the loan.

	A	B	C	D	E	F	G
1	<b>Empire Bank Lending Decision Support System</b>						
2							
3		Customer Name:	Robyn Banx				
4							
5		Loan Amount	\$250,000.00				
6							
7		Interest Rate	7.00%				
8							
9		Monthly Repayments	\$ 1,766.95				
10							
11		Monthly Income	\$ 5,300.85				
12							
13		<b>Recommendation</b>					
14		Approve Loan	Yes				
15							

- (i) Propose whether this situation is structured, semistructured or unstructured and justify your answer. 2
- (ii) Empire Bank will not approve loans if the Monthly Repayments are more than one third of the Monthly Income. Suggest a formula that could be used in cell C14 to determine whether or not the loan is approved. 2
- (iii) Describe how what-if scenarios could be used in this situation. 2
- (iv) Robyn's loan is approved, but unfortunately she loses her job and cannot continue to make the repayments on her loan. The bank officer is reprimanded for making a "bad loan", but he blames the Empire Bank Lending Decision Support System. 4

Critically analyse the responsibilities of those involved in this loan application and approval.

**End of Question 26**



**Question 27 – Automated Manufacturing Systems (20 marks)****Marks**

Use SEPARATE writing booklet.

- |     |      |  |          |
|-----|------|--|----------|
| (a) | (i)  | Describe CAD and CAM using an example  | <b>3</b> |
|     | (ii) | Describe a situation in an automated manufacturing system where noise could occur and how it could be reduced. | <b>3</b> |

Use the following information to answer parts (b)-(c)

Nick's Pizzas uses assembly line production to produce pizzas. Pizzas are prepared by humans rolling the pastry and putting the toppings on Pizzas eg pizza sauce, ham and pineapple. The pizzas are then put on a conveyor belt system that uses an actuator to move the conveyor belt through an oven. The Pizzas are cooked in an oven that is computer controlled from the input from a sensor. The pizzas then move along a conveyor belt to a location where they are cut and packed into cartons by human workers for distribution.

- |     |   |   |          |
|-----|---|---|----------|
| (b) | (i)   | Draw a Block Diagram to show more detail of human and computer controlled tasks, including <ul style="list-style-type: none"><li>• preparing the pizzas</li><li>• cooking the pizzas</li><li>• packing the pizzas</li></ul> | <b>4</b> |
|     | (ii)  | Describe a suitable actuator and sensor that could be used at Nick's Pizza on the production line.  | <b>4</b> |
| (c) | Nick's pizzas have decided to purchase a Robot arm to remove the pizzas from the conveyor belt, cut the pizza and pack the pizza into cartons. Workers who normally cut and pack pizzas will be relocated to customer service or jobs preparing Pizzas. |   |          |
|     | (i)   | Identify the type of processing that could be used at Nick's Pizzas as batch , discrete or continuous and justify your answer.  | <b>3</b> |
|     | (ii)  | Discuss the nature of work issues arising from the introduction of robots to the production line at Nick's Pizza's.   | <b>3</b> |

**Question 28 – Multi-media Systems (20 marks)****Marks**

Use SEPARATE writing booklet.

- (a) Describe the following terms in relation to multi-media:
- (i) resolution 2
  - (ii) warping 2
- (b) A couple who are getting married wish to create a multimedia DVD of their wedding day to give to their guests as a thank you gift. They are currently deciding whether to create the DVD themselves or to outsource the work.
- (i) Identify the information technology required for collection. 2
  - (ii) There are a number of fields of expertise in multimedia development. If the couple decide to outsource the work, describe the role of ONE expert in the development of the DVD. 2
- (c)
- (i) Explain how sound is digitised. 2
  - (ii) What is the difference between sampling rate and sample size in audio files. 3
  - (iii) Assess the widespread use of compressed audio files. 3
- (d) Choose ONE emerging technology and critically evaluate its impact on multimedia systems. 4

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