St George Christian School

Student name: _____

2001
HIGHER SCHOOL CERTIFICATE
HALF YEARY EXAMINATION

Information Processes and Technology

Time allowed – Three hours
(Plus 5 minutes reading time)

General Instructions

Reading time – 5 minutes

Working time – 3 hours

Write using blue or black pen

⬭ **Section I** Pages 3 – 6

Total marks **(20)**
- Attempt Questions 1 – 20
- Allow about 40 minutes for this section

⬭ **Section II** Pages 7 – 13

Total marks **(40)**
- Attempt Questions 21 – 24
- Allow about 1 hour and 10 minutes for this section

⬭ **Section III** Page 14-18

Total marks **(40)**
- Attempt Questions 25 and 26
- Allow about 1 hour and 10 minutes for this section

Mulitple Choice Answer Sheet

Select the alternative A, B, C or D that best answers the question. Fill in the response oval completely.

Sample   2 + 4 =   **(A) 2**   **(B) 6**   **(C) 8**   **(D) 9**

A ○   B ●   C ○   D ○

If you think you have made a mistake, put a cross through the incorrect answer and fill in the new answer.

A ●   B ✖   C ○   D ○

If you change your mind and have crossed out what you consider to be the correct answer, then indicate this by writing the word *correct* and drawing an arrow as follows:

correct

A ✖   B ✖   C ○   D ○

Q1	A ○	B ○	C ○	D ○
Q2	A ○	B ○	C ○	D ○
Q3	A ○	B ○	C ○	D ○
Q4	A ○	B ○	C ○	D ○
Q5	A ○	B ○	C ○	D ○
Q6	A ○	B ○	C ○	D ○
Q7	A ○	B ○	C ○	D ○
Q8	A ○	B ○	C ○	D ○
Q9	A ○	B ○	C ○	D ○
Q10	A ○	B ○	C ○	D ○
Q11	A ○	B ○	C ○	D ○
Q12	A ○	B ○	C ○	D ○
Q13	A ○	B ○	C ○	D ○
Q14	A ○	B ○	C ○	D ○
Q15	A ○	B ○	C ○	D ○
Q16	A ○	B ○	C ○	D ○
Q17	A ○	B ○	C ○	D ○
Q18	A ○	B ○	C ○	D ○
Q19	A ○	B ○	C ○	D ○
Q20	A ○	B ○	C ○	D ○

1 A Web-based mail-order company is investigating the most appropriate way for employees to conduct internal communication.
What is the most likely reason for the company to reject a paper-based system?
(A) It is not economically feasible.
(B) It is not technically feasible.
(C) It does not fit the company's objectives.
(D) It is not a feasible solution in the available time frame.

2 In a high school library, books can be borrowed by using a borrower's card that has a magnetic strip uniquely identifying the borrower. Which information process is involved when the borrower card is "swiped" to read its magnetic strip?
(A) organising
(B) processing
(C) storing and retrieving
(D) collecting

3 At what stage of the system development cycle is it difficult and more expensive to identify and solve problems ?
(A) implementing
(B) testing, evaluating and maintaining
(C) making decisions
(D) designing decisions

4 Technical feasibility:
(A) compares the costs of developing the new system with the expected benefits
(B) determines the information technology requirements of the new system and the demands that will be placed on the new system
(C) determines whether time is available to implement the new system
(D) determines whether the new system will fit into the organisation and meet the current goals and objectives

5 The uniform resource locator used to find the syllabus for this course is
http://www.boardofstudies.nsw.edu.au/syllabus99linfoprotech_syl.pdf
The segment 'www.boardofstudies.nsw.edu.au' is the
(A) URL.
(B) hypertext transfer protocol.
(C) name of the resource file.
(D) domain name of the server containing the resource.

6 What is the best way for a university to organise data about students and the courses in which they are enrolled?
(A) On a course web-site
(B) In a relational database
(C) In a flat-file database
(D) As hypermedia

7   What type of data organisation method is illustrated by the following diagram?
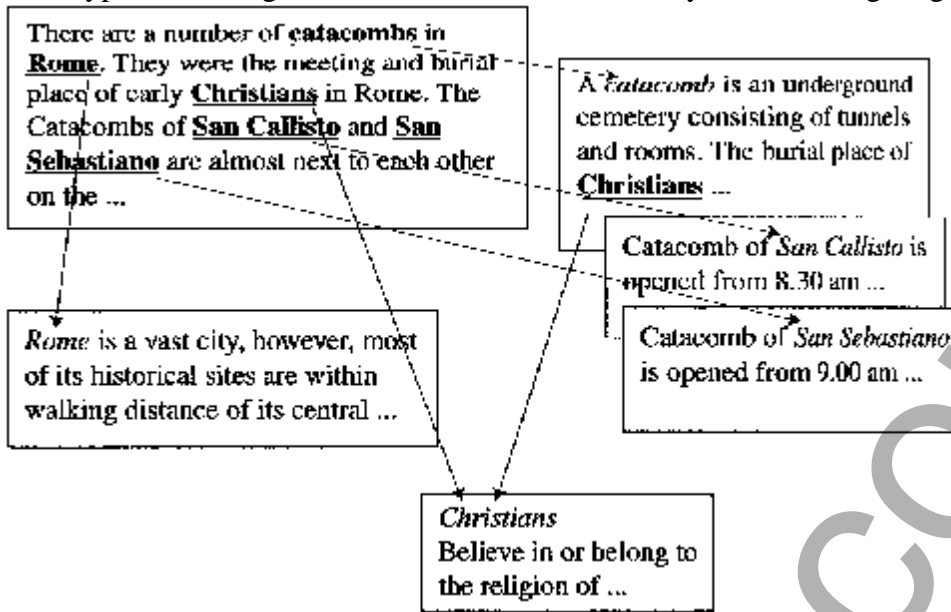
(A)   Hypertext
(B)   Flowchart
(C)   Top-down design
(D)   Relational database

8   Which of the following is the best way to validate information retrieved from the Internet?
(A)   Access the information using a variety of search engines.
(B)   Determine the number of visitors the Internet site has had.
(C)   Verify information with a variety of other sources.
(D)   Identify the author of the information.

9   It has been decided to network a small number of users in an office so that they can all access one database at the same time. A computer is required to control access to this database.
What is this computer called?
(A)   File Server
(B)   Client Server
(C)   File / Client Server
(D)   Print / Client Server

10   Where is electronic mail stored when a web-based mail package is used?
(A)   on the internet service provider's computer
(B)   on the sender's computer
(C)   on the receiver's computer
(D)   on the Post Office's mainframe computer

11   An organisation has decided to systematically replace each employee's desk-top computer with a laptop computer over a three-year period. When each desk-top reaches a certain age, it is replaced with a new laptop.
What name is given to this type of conversion method?
(A)   Pilot
(B)   Direct
(C)   Parallel
(D)   Phased

12.
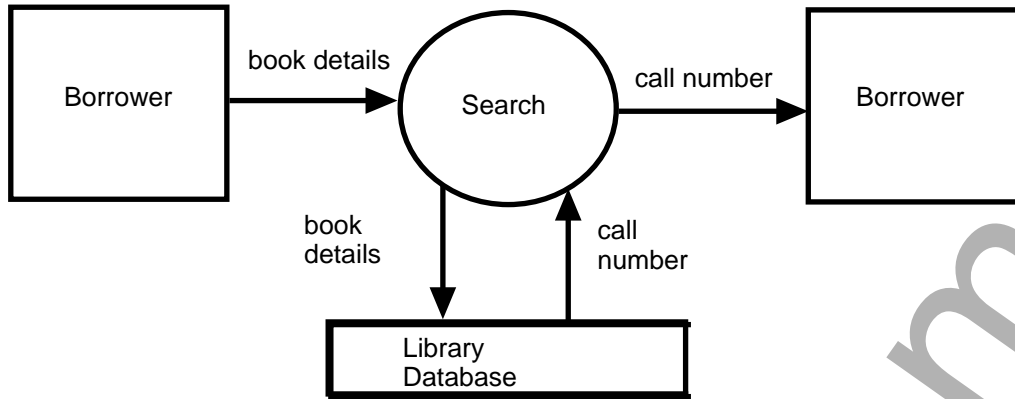
The diagram is a context diagram for a simple library computer system. What is the main purpose of the arrows in this diagram?
(A) to show movement of data between processes, external entities and data stores
(B) to show movement of data between components within the library system
(C) to show movement of data between the search process and external entities.
(D) to show movement of data within the data store

13 A company has decided that its information system is inadequate for its future needs. The participants in the system are uncertain of their requirements for the new system.
What would be the best approach to help solve this problem?
(A) Construct a project plan for developing the new system.
(B) Tell the participants what their requirements are.
(C) Construct a prototype of an improved information system.
(D) Interview the participants, using active listening skills.

14 Which set of variables must be compatible before two connected computers can transmit to each other?
(A) Baud rate, parity and number of data bits
(B) Parity, number of data bits and computer platforms
(C) Parity, baud rate and communications software package
(D) Communications software package, computer platforms and baud rate

15 The following seven-bit ASCII character and parity bit were transmitted as

ASCII character   Parity bit
1011010   0

They were received as

ASCII character   Parity bit
1010010   1

Which statement accurately reflects this situation?

(A) The data were sent as odd parity and would be interpreted by the receiver as correct.
(B) The data were sent as odd parity and would be interpreted by the receiver as incorrect.
(C) The data were sent as even parity and would be interpreted by the receiver as correct.
(D) The data were sent as even parity and would be interpreted by the receiver as incorrect.

16   Which of the following best describes the logical arrangement of a relational database?
      (A)   Relationships occur between attributes
      (B)   Attributes occur between relationships
      (C)   Entities are described by attributes
      (D)   Entities are described by relationships

17   When data validation has occurred, which of the following is true?
      (A)   The piece of data is correct
      (B)   The piece of data is possibly correct
      (C)   The piece of data is unique
      (D)   The piece of data is unnecessary

18   A network is organised so that it continues to function unless one particular computer is
      disconnected or has a malfunction. This topology is a:
      (A)   star
      (B)   ring
      (C)   gateway
      (D)   bus

19   To safeguard data on a networked computer against viruses, computer failure and a malicious
      user – what would be the best precaution to take?
      (A)   Encrypt the data
      (B)   Password protect the data
      (C)   Backup the data
      (D)   Put the computer in a locked room

20   The NSW Department of Education won't allow students to be identified on the school web
      site. This is a case of:
      (A)   access
      (B)   freedom of information
      (C)   privacy
      (D)   ethics

Section II.

Total marks (40)
Attempt Questions 21 – 24
Allow about 1 hour and 10 minutes for this section

Answer the questions in the space provided.

Question 21. (10 marks)   Project Work

The Roads and Traffic Authority (RTA) is an organization that uses a database information system. Its purposes are to ensure vehicles are safe and to provide individuals with a driver's licence. The RTA performs a set of information processes that requires participants, data/information and information technology.

When the owner of a vehicle needs to renew the registration, he or she requires a pink slip and a green slip. These forms are presented to the RTA staff along with the old Certificate of Registration. Computer terminals are used to update the data, and a central database is automatically updated with the details of the vehicle, such as plate number, model and engine number. The owner pays the registration. Updated details are then printed on a new Certificate of Registration, which is issued to the owner.

Q21(a) (6 marks)   Complete the following diagram representing the RTA information system in context.

RTA Database Information System

Purpose

Information processes

Participants   Data   Info Technology
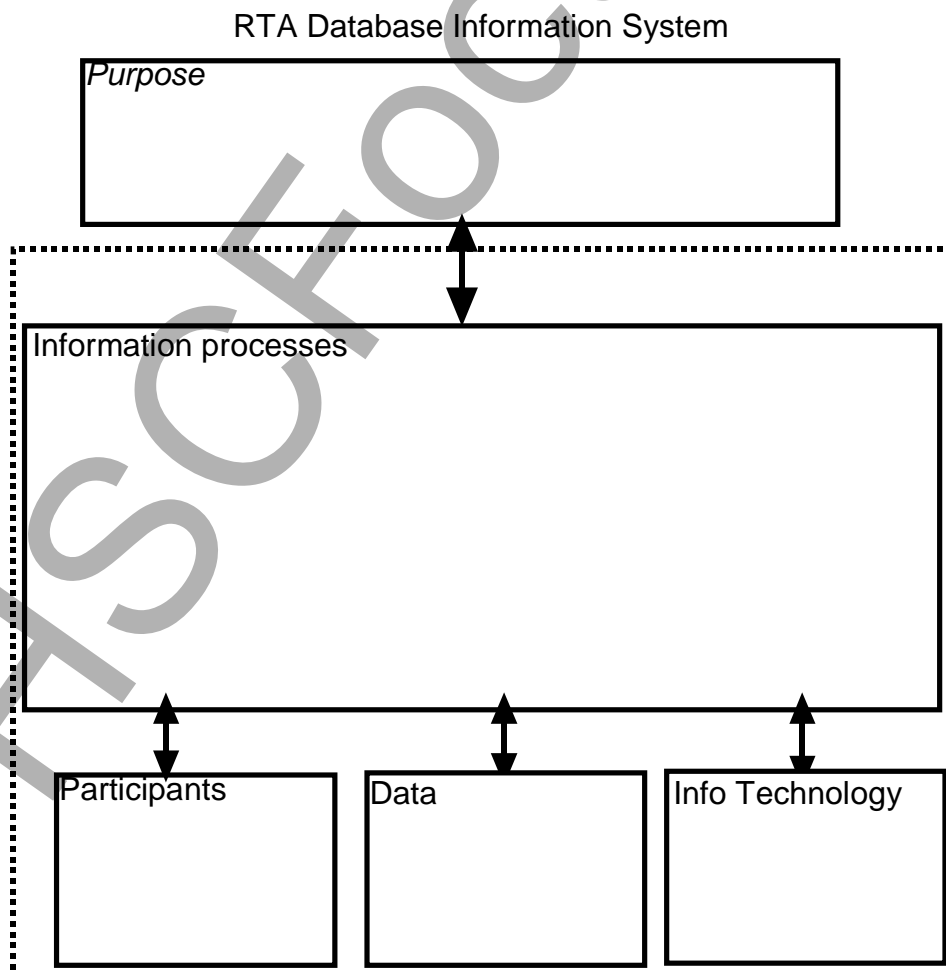
Question 21 continued…

Q21(b) (4 marks) Draw a data flow diagram representing the process of renewing a vehicle's registration.

Question 22 (10 marks)   Project Work

Q22(a) (1 mark)   What is a Gantt chart used for ?

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Q22(b) (4 marks)   Solutions to past HSC examinations are published by a company as a booklet
of about 10 exams and their possible solutions for each main subject studied at
HSC level. This year management has decided to include a CD with each
booklet containing the same information, that can now be searched using
keywords using a computer. Explain the type and function of any information
technology needed to produce this CD.

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Q22(c) (5 marks)   At a university library, a student is able to borrow special "closed reserve"
books by giving their student card to the library attendant. They can then read,
take notes or photocopy sections from this book. When they have finished, the
book is returned to "closed reserve" and their student card given back. If any
damage to the book is discovered the university library is unable to identify the
students who have borrowed the book. Briefly outline a solution to this
problem describing any information processes involved.

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Answer the questions in the space provided.

Question 23 (10 marks)　　　　Information Systems & Databases

Jenny is a piano teacher who conducts lessons for a number of different students of varying ages and with varying skills. She wishes to use a database information system to keep track of her students and appointments for each lesson. She also needs to track receipt of monies paid for lessons, as some students pay each lesson, and others pay in biweekly or monthly installments. Initially the database relationship structure is constructed with the following tables:

STUDENT

STUDENT
StudentID
Name
Phone
Age
DateOfBirth
Gender

APPOINTMENTS

APPOINTMENTS
AppointmentID
StudentID
AppointmentTime
MoniesPaid
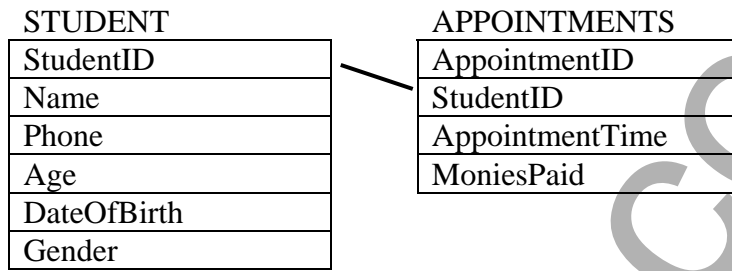
Q23(a)　(1 mark)　Name a field which is not required. Explain why this field is unnecessary.

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Q23(b)　(1 mark)　Name a field which could be separated into two fields. Describe any advantages for this separation.

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Q23(c)　(4 marks)　Jenny requires a report detailing total monies paid in the past financial year for taxation purposes. Describe a query and report design that would provide this information.

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Question 23 continued…

Q23(d)　(4 marks)　Redesign the database tables and relationships to improve the information
system so that:
  (i)　the field problems raised in (a) and (b) above are resolved;
  (ii)　a separate transactions table can be used to track the monies paid by each
　　　student.

Answer the questions in the space provided.

Question 24 (10 marks)   Information Systems & Databases

Q24(a) A car company keeps a record of details of all people enquiring about new cars. The salesperson fills out a card and stores each card in a manual filing system. As the company grows, management decides to store these details using an electronic flat file database. The information is still entered on cards but is then entered into the computer each week by the office staff. The name of the file is 'CAR SALES'.

  (i) (2 marks) The company finds the use of the electronic flat file database quicker and easier than the manual system. Explain TWO other advantages for the company in using an electronic database compared to using the manual filing system.

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  (ii) (2 marks) Discuss ONE design feature of a database screen layout that will assist the data entry operator when using the system.

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Q24(b) A central library database is being designed to service a number of regional branches. This database will be used to record, for each book, the title, author, publisher, year of publication and cost, as well as the location of the book and its subject area.
  (i) (2 marks) Draw a screen layout suitable for data entry by staff with little skill in using computers.

Question 24 continued…

(ii) (2 marks) Borrowers will use the database to search for books. Which fields should be displayed on the borrower's input screen? Justify your answer.

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(iii) (3 marks) An alternative to this system was to store the information about the books at each branch at that branch and then allow this information to be accessed by the other branches.
What is a system such as this called? Describe one advantage and one disadvantage of using this alternative system compared with the central library database.

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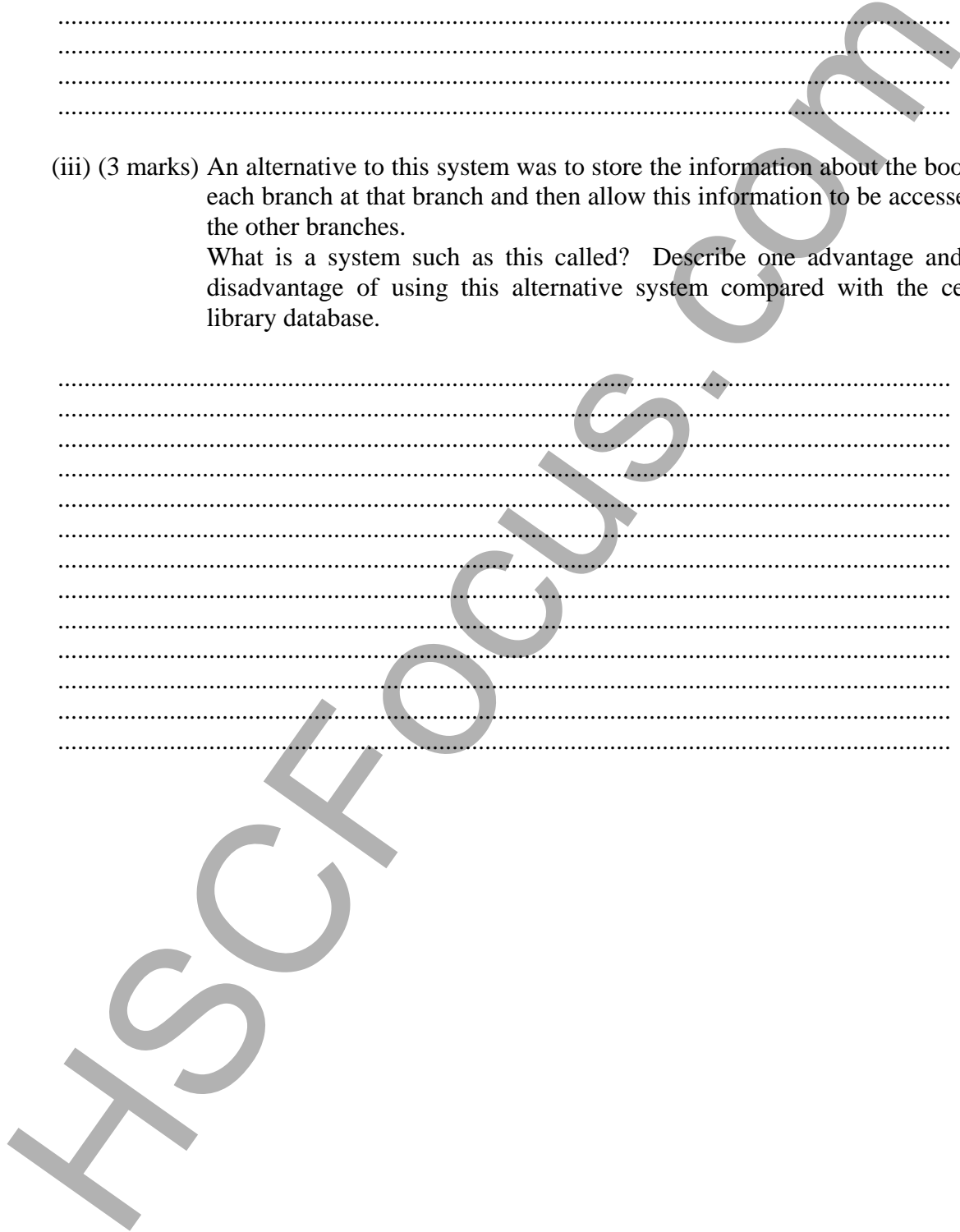
Section III.

Total marks (40)
Attempt Questions 25 – 26
Allow about 1 hour and 10 minutes for this section

Answer the questions in the space provided.

Question 25 (20 marks)   Communication Systems

Q25(a) A remote database relating to Computing Studies is available on an electronic bulletin board system. A sample screen is shown below.
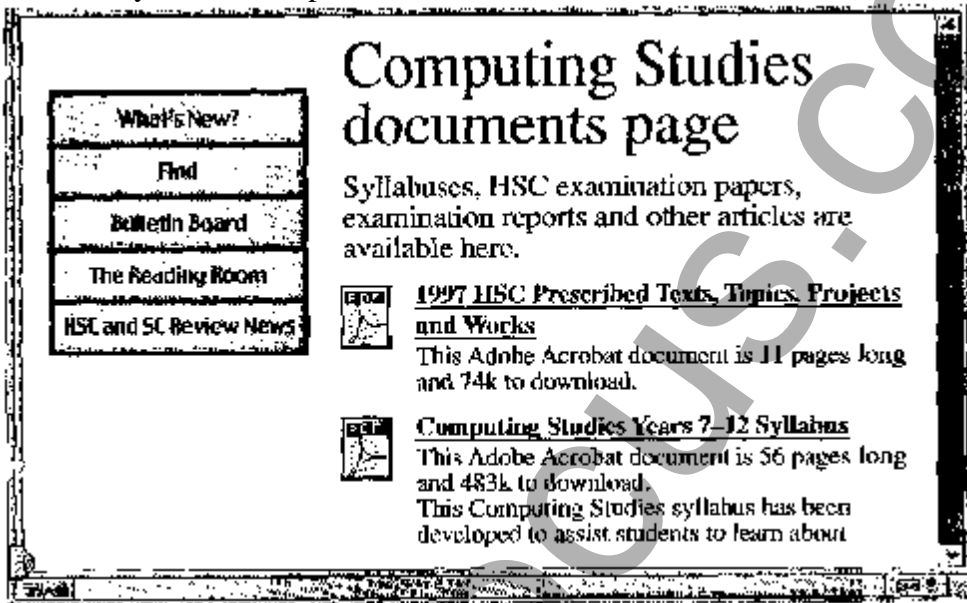
The information on the 1997 HSC Prescribed Texts, Topics, Projects and Works can be downloaded from the bulletin board by selecting the option in shown in the above picture.

(i)   (2 marks) Describe TWO technical factors that would affect the speed with which this information would be received by a remote computer.

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(ii) (2 marks) Discuss TWO advantages of publishing the 1997 HSC Prescribed Texts, Topics, Projects and Works in a remote database rather than on a CD-ROM.

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Question 25 continued…

(iii) (2 marks) Show how you would calculate how long the 1997 Prescribed Texts files would take to download at 56 kbps.

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Q25(b) Error-checking is an important part of computer communications.

(i) (4 marks) Describe, and illustrate with an example, how the checksum error-checking technique is used in getting data from sender to receiver.

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(ii) (2 marks) Give an example of an 8-bit data block and its corruption that checksum will detect the error but parity will not.

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(iii) (2 marks) Give an example of an 8-bit data block and its corruption that CRC will detect the error but parity will not.

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Question 25 continued…

Q25(c)   (6 marks)   Star, bus and ring are three topologies used for LANs.   Represent EACH topology diagrammatically using a square ☐ to represent a node.   You must show at least FIVE nodes and the appropriate physical connections.

Answer the questions in the space provided.

Question 26 (20 marks)   Communication Systems

Q26(a) (4 marks) Collisions between data are an issue that every network protocol has to contend with. Describe the different ways that Ethernet and Token Ring handle collisions.

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Q26(b) Bob's Book Company offers an Internet service for customers who can:
  • register preferences for categories of books they prefer to buy;
  • place orders for books using their credit card.
The company stores the data in a database.

(i) (2 marks) Discuss TWO methods that could be used to keep customer credit card details secure against unauthorised access.

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(ii) (2 marks) Research has shown that book preferences are a good indicator of customer preferences for types of music and videos. What are the ethics of a book company passing on data about customers and their book preferences to video and music companies?

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Question 26 continued…

(iii) (2 marks) The Customer_Preference table in the database has the following fields:
- Customer_number;
- Books_category_preference.

Write an SQL statement to select all customers who might be interested in buying a new book about Asian politics.

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Q26(c) Net Returns is an accounting company that specialises in individual and small – business tax returns. The accountants employed by Net Returns do not work in an office. Each accountant carries a laptop and accesses the Internet using a mobile phone. Tax returns are lodged electronically to the taxation office using the Internet.

(i) (1 mark) Identify the transmission medium that this communication system uses.

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(ii) (4 marks) Identify the participants and users in this system and describe the information technology required to support communication between them. You may use a diagram.

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(iii) (5 marks) Explain how this information technology may impact on the accountants employed by Net Returns.

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