J A M E S   R U S E
AGRICULTURAL HIGH SCHOOL

2009
HIGHER SCHOOL CERTIFICATE
INTERNAL EXAMINATION

Name:	
MARK ALLOCATION: STAFF USE ONLY	
Section A	/20
Section B	/60
Section C	/20
Total mark	**/100**

Information Processes and Technology

HSC TERM 1 ASSESSMENT TASK

General Instructions
- Reading time – 5 minutes
- Working time – 90 minutes
- Write using black or blue pen
- Draw diagrams using pencil
- Mark allocations are provided for each question

Total marks – 100

(**Section A**) Pages 2–7

20 marks
- Attempt Questions 1–20
- Allow about 15 minutes for this section

(**Section B**) Pages 8–16

60 marks
- Attempt Questions 21–23
- Allow about 60 minutes for this section

(**Section C**) Pages 17–21

20 marks
- Attempt either Question 24 or Question 25
- Allow about 15 minutes for this section

SECTION A: ANSWER SHEET

Question 1 to 20: Multiple Choice

Mark the correct box with an X.

QUESTION	A	B	C	D
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				

SECTION A
Multiple Choice

1. Which of the following is a kind of database?

    a. Filing cabinet
    b. Microsoft Access file
    c. Piece of paper
    d. All of the above

2. Which of the following is NOT an advantage of computer-based information systems?

    a. Considerably faster than manual systems
    b. Data can be provided in any order
    c. Less training is required to use them
    d. It is easier to exchange data with others

3. Consider the following database.

Name	Favourite Fast Food	Class	Age
Guy Berryman	McDonald's	11K	17
Will Champion	Pizza Hut	9C	15
Chris Martin	KFC	10A	16
Jonny Buckland	Dominoes	12L	17

"Charlie Lowell, Pizza Hut, 9C, 15" describes:
    a. A field
    b. The key field
    c. A file
    d. A record

4. Which of the following is the best description of an *entity?*

    a. An individual person represented in a database
    b. A specific thing about which an information system collects and processes data
    c. One record in a database
    d. A participant in an information system

5. A company is constructing a hypertext-based prototype for their customer website.

    Which of the following would be most useful in representing the design?
    a. Schematic diagram
    b. System flowchart
    c. Context diagram
    d. Gantt chart

6. A query that finds all licensed drivers, who are younger than 21 years old that have had either a speeding fine or a red light camera offence, would be:

    a. Age < 21 AND Offence = Speeding OR Offence = Red light
    b. Licence = YES AND Age < 21 AND Offence = Speeding OR Offence = Red light
    c. Licence = YES, Age > 21, Offence = Speeding, Offence = Red light
    d. Licence = YES AND Age < 21 AND Offence = Speeding OR Red light

7. In a relational database, a *relationship* indicates:

    a. Fields within a table are related to one another
    b. That a particular field uniquely identifies that record
    c. That two tables share common data
    d. That two tables have identical data

8. Johnny checks his database to make sure that all of his data are within acceptable and appropriate ranges.

    What method of checking is he performing?
    a. Data integrity
    b. Cross-checking
    c. Normalisation
    d. Data validation

Questions 9 and 10 refer to the database below.

Serial Number	First Name	Last Name	Category
33256	Amanda	Smith	Accountant
33123	Joy	Smythe	Receptionist
34589	John	Smithers	Cleaner
33212	Joe	Smithers	Manager
35091	Lola	Sompson	Temporary staff

9. The table is first sorted by the First Name field in ascending order, then by the Last Name field in ascending order. What is the third record after these sorts take place?
   a. Joy Smythe
   b. John Smithers
   c. Amanda Smith
   d. Joe Smithers

10. The following query is performed on the database: **Last Name = Sm*h**

   What result will be displayed?
   a. Smith
   b. Smythe
   c. Smithers
   d. Sompson

11. In a relational database, the rows and columns represent respectively:
   a. Attributes and fields
   b. Records and fields
   c. Fields and records
   d. Attributes and records

12. What is the name given to the device that allows LANs using different protocols to communicate with each other?
    a. Bridge
    b. Router
    c. Hybrid topology
    d. Gateway

13. There are numerous reasons why a company might elect to use a teleconferencing system for its communications. The major reason is:
    a. It is a conceptually simple and therefore cheaper solution
    b. Teleconferencing is just like a face-to-face meeting
    c. It reduces otherwise necessary travel time and increases productivity
    d. It is a high-tech solution that effectively impresses clients

14. A protocol is best described as:
    a. A set of rules that governs the transfer of data between computers
    b. Is an agreed-upon method of error correction on a network
    c. An exchange of information
    d. A set of software and hardware handshakes

15. Any computer network requires nodes, NICs and links (either through cables or a wireless access point). Which of the following network topologies requires more kinds of hardware?
    a. Bus
    b. Star
    c. Ring
    d. Point-to-point

16. Tokens and frames are most likely to be found on which network topology?
    a. Hybrid
    b. Mesh
    c. Star
    d. Ring

17. Which of the following is NOT one of the main aims of a network?

    a. Sharing of documents, data and software
    b. Reducing budget expenditure on redundant hardware
    c. Increasing data security
    d. Communication with others

18. Which of the following processes takes place in a communication system?

    a. Transmitting & Receiving, Storing & Retrieving, Analysing
    b. Display, Analysing, Organising
    c. Processing, Collecting, Storing & Retrieving
    d. All of the above

19. NIC stands for:

    a. Non-Inclusive Characters
    b. Nice Internet Connection
    c. Network Interface Card
    d. Novell Interactive Computer

20. Which of the following is in order from least sophistication to most sophistication?
    a. Router, Hub, Switch
    b. Hub, Router, Switch
    c. Switch, Router, Hub
    d. Hub, Switch, Router

SECTION B
Extended Answer

QUESTION 21 [**20 marks**]

Databases R Us (DRU) is a new company, specialising in the conversion of manually-stored data to electronic-based information systems of varying kinds, according to the needs of its clients. DRU has already attracted a wide variety of customers: corporations without dedicated IT departments; schools with massive amounts of resources stored only on paper; banks with old records that need to be digitised, and even personal clients who seek to have collections of VHS tapes and vinyl records stored electronically and catalogued.

However, since the company is just starting up, both the marketing and technical support departments of DRU comprise of a single person – you.

 a. DRU is about to release a new brochure for the company, with the goal of **[8]** broadening its clientele to include those who are not convinced of the value of electronic databases over non-computer-based methods of storing data. As part of this brochure, describe and contrast the disadvantages of manual data storage methods with the advantages of computer-based databases.

b. A number of potential DRU clients have expressed confusion at the difference **[8]** between *flat-file* and *relational* databases. To assist clients in choosing between one or the other, explain the unique strengths of each type of database. For each type of database, provide one example of client data that would be appropriate for it and not for its counterpart.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

c. A musician has approached DRU to convert his touring schedule into an electronic **[6]** database. Previously, he kept records of performance times and locations in his hand-written journal, and his manager rang up radio stations to organise for these times to be publicised and advertised. Now, however, the musician wants the data about his gigs to be widely distributed directly from the database. No processing of his touring schedule is required.

What kind of database system would you recommend to the musician? Justify your recommendation with specific reference to the features of the system you choose.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

QUESTION 22 [20 marks]

In response to the recent Victorian bushfires, the Australian federal government has decided to commission the design and implementation of a highly-upgraded communications system specifically the use of national emergency services. The new communications system is to provide a high-bandwidth, country-wide network accessible to all emergency services.

Some of its goals are: to enable rapid responses and relocation of personnel to disaster situations; to ensure accurate communication of vital data and statistics between intra- and inter-state emergency services; to provide assistance to medical staff by expert doctors in remote locations; to facilitate the safe evacuation of people in danger, and to guarantee the transfer of casualties to safety.

a. Give examples of how each of the following are occurring within this particular communications system. **[7]**

Collecting _____

_____

Organising _____

_____

Analysing _____

_____

Storing/Retrieving _____

_____

Processing _____

_____

Transmitting/Receiving _____

_____

Displaying _____

_____

b. Due to the important nature of the data that will be circulated by this communications system, error detection and correction is paramount. Outline the *parity check* method of detecting errors and explain why it would not be a sufficiently reliable method in this context. **[4]**
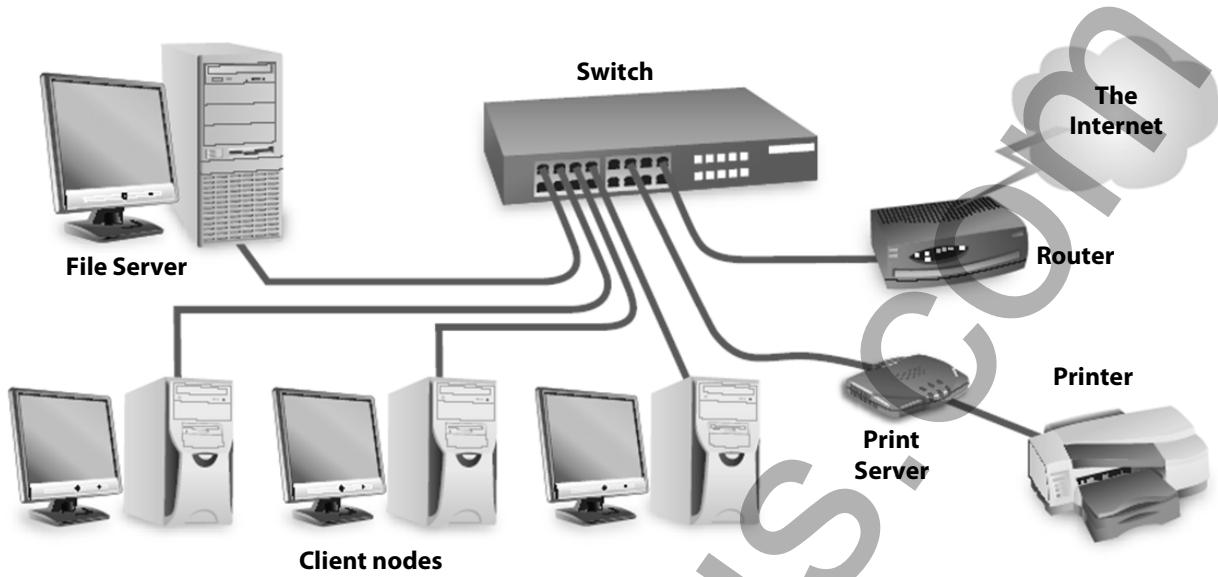
_____

_____

_____

_____

_____

_____

_____

_____

_____

c. One of the major features of the new communications system is a wireless WAN **[4]** that serves emergency vehicles and allows them to receive real-time data (such as relevant satellite imagery) or transmit real-time data (such as patient status) directly from a field location. Describe the network devices required for such an arrangement.

_____

_____

_____

_____

_____

_____

_____

_____

_____

d. The NSW Fire Brigade is leading the push for all firefighters to have GPS (Global **[5]** Positioning System) locators implanted on their bodies, so that all firefighters on duty can be accurately located and tracked in real-time, and rescued or brought to safety even if conventional means of communications break down. Other states disagree based on social and ethical grounds. Briefly outline the arguments for and against this initiative.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

QUESTION 23 [20 marks]

The diagram below depicts the network being run in a small office.

a. Describe the topology of this network, and outline some of the weaknesses that characterise this topology. [3]

_____

_____

_____

_____

_____

_____

_____

b. A person logged onto one of the client nodes edits one of their documents on the **[6]**
file server, saves it and then attaches it to an email using a *www.gmail.com*
account. This email is sent to a colleague's address. The colleague opens the email,
downloads the attachment, and sends a copy of the document to be printed.

Draw a data flow diagram below that clearly shows ALL the steps that the data
took during the procedure described above.

c. In the network diagram provided, the internet is represented by a cloud. "Cloud Computing" is a term that refers to the increasing trend of personal and business users using internet-based network services for their information processing and storage needs. Some experts predict that in the near future, all the data and applications we use on a daily basis will be stored somewhere "in the cloud" rather than on a hard drive in our home computer. **[7]**

Evaluate the effects of this trend on the network outlined above, demonstrating with examples of particular advantages or disadvantages.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

d. What does CSMA/CD stand for? **[1]**

_____

e. Describe how CSMA/CD would function to ensure the reliable transmitting and **[3]**
    receiving of data in the network.

_____

_____

_____

_____

_____

_____

_____

SECTION C
Extended Answer

Attempt either Question 24 or 25

QUESTION 24 **[20 marks]**

Due to their importance in decision-making processes, databases can often be the sources of significant social and ethical issues.

Parramatta City Council maintains a relational database of all the individuals who come under its jurisdiction in one way or another. This includes all people who live, work or study within the surrounding area. The database contains fields such as age, ethnicity, home address, household income, occupation, marital status, and many more.

a. Describe the problems that might arise if the council's database was incomplete or **[5]**
    inaccurate.

_____

_____

_____

_____

_____

_____

_____

_____

_____

b. Several community groups have raised concerns regarding the privacy of personal data stored in the council database. Outline two ways that such data could be misused, and justify why the council should still be able to hold such data within their database. **[6]**

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

c. When the national census is issued, results are collected and the council's database is updated extensively. This vast amount of data must be analysed and displayed in a way that is useful for those attempting to read it. Choose ONE of the following and describe the information that could be derived from using it: (i) query, (ii) sort, (iii) report, (iv) form view. **[3]**

_____

_____

_____

_____

_____

_____

_____

_____

_____

d. Data validation and verification are enormously important processes in an official database like the council's. Describe measures the council could take to ensure that the *address details* stored in their database are (i) valid and (ii) accurate. **[6]**

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

QUESTION 25 [**20 marks**]

The global internet used today had its roots in the ARPANET (Advanced Research Projects Agency Network), which was developed by the United States Department of Defense. The basic ideas, systems and protocols underpinning the system were invented then, and many persist to this day. However, communications systems like the internet have given rise to social and ethical issues that the original designers never even imagined.

a. Describe the principal benefits and drawbacks that have come about through the widespread use of the internet for communications. [5]

_____

_____

_____

_____

_____

_____

_____

_____

b. Discuss the changes that have occurred with regard to employment in the banking sector as a direct result of the rise of effective electronic communications systems. [5]

_____

_____

_____

_____

_____

_____

_____

c. Internet filtering is a daily and legal reality for the vast majority of countries, not just computers operating within the DET network. Certain websites are blocked or allowed based on the content that they are displaying. Assess the value of widespread internet censorship, making reference to its effectiveness (or lack thereof) and to the paradoxical nature of attempting to control a fundamentally uncontrolled environment such as the internet. **[5]**

_____

_____

_____

_____

_____

_____

_____

_____

_____

d. Monetary transactions now occur frequently over the internet. Outline the advantages and disadvantages of being able to manipulate money electronically, rather than being forced to resort to physical means in order to transfer money. **[5]**

_____

_____

_____

_____

_____

_____

_____

_____

_____

- END OF EXAM -