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

2009
HIGHER SCHOOL CERTIFICATE
INTERNAL EXAMINATION

Information Processes and Technology

HSC TERM 2 ASSESSMENT TASK

General Instructions
- Reading time – 5 minutes
- Working time – 2 hours
- 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 25 minutes for this section

Section B   Pages 8–20

80 marks
- Attempt Questions 21–23
- Allow about 95 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
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2				
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18				
19				
20				

SECTION A
Multiple Choice

1. Hypermedia, by its very nature, CANNOT be transferred to:

    a. An optical disk
    b. Another computer
    c. A paper document
    d. A computer network

2. The medium of text is:

    a. Alphabetic characters
    b. Any sequence of symbols that have meaning
    c. ASCII
    d. The most basic form of data

3. An online advertising agent is looking to create an advertisement with maximum audience impact and minimum file size.

    Which of the following media is she most likely to choose?
    a. Audio
    b. Video
    c. Text
    d. Images

4. The most common type of LAN cabling is:

    a. Coaxial cable
    b. UTP
    c. Optical fibre
    d. Telephone wiring

5. Which of the following is NOT true of animation?

   a. It is only effective because of persistence of vision
   b. It does not include audio data
   c. Its depiction of motion is an optical illusion
   d. It is the most bandwidth-intensive medium

6. Choose which statements are correct:
   I. High resolution displays are associated with smaller pixels.
   II. High resolution displays are associated with a large frame buffer.
   a. I only
   b. II only
   c. Both I and II
   d. Neither I nor II

7. Two adjacent computer screens are displaying the same photo, screen A at 16-bit and screen B at 24-bit. How many MORE colours are visible on screen B?
   a. 50% more than on the first
   b. Approximately ten times more than on the first
   c. Approximately a hundred times more than on the first
   d. Approximately two hundred times more than on the first

8. Older-generation computers were fitted with displays that supported 1-bit colour. As a result of this limitation:

   a. The screens could only display black and white
   b. The screens were limited to two colours
   c. Each pixel on the screen required exactly one byte in the frame buffer
   d. They were harder to read than screens with higher bit-depth

9. HSL is a code that:

   a. Describes different colours numerically
   b. Enables a system to display more colours than the RGB code
   c. Is more suited to printing than the CMYK code
   d. Only allows for greyscale image data

10. Which of the following types of animation would require the most manual input from a graphic artist?

    a. Cel-based animation
    b. Path-based animation
    c. Morphing
    d. Warping

11. A CRT displays graphical media by:

    a. Hitting a phosphor-coated screen with a controlled beam of photons
    b. Using a layer of material that can change its optical properties when electric current is applied to it
    c. Shining a bright light onto a Digital Light Processor
    d. Hitting a phosphor-coated screen with a controlled beam of electrons

12. To create the illusion of sound coming from a specific direction, systems require a minimum of:

    a. One speaker
    b. Two speakers
    c. Four speakers
    d. 5.1 stereo surround sound

13. Which of the following lists multimedia design software in ascending order according to cost and complexity?

    a. Presentation & Authoring, Applications Packages, Scripting, Programming Languages
    b. Applications Packages, Scripting, Presentation & Authoring, Programming Languages
    c. Applications Packages, Presentation & Authoring, Scripting, Programming Languages
    d. Presentation & Authoring, Scripting, Applications Packages, Programming Languages

14. The key benefits of liquid crystal displays are:

   a. Smaller size
   b. Lighter weight
   c. Lower power consumption
   d. All of the above

15. Which of the following is NOT directly related to the *collecting* process?

   a. Digitising live video for broadcast on national television
   b. JPG image compression within a digital camera
   c. X-Y microphone setup at a radio station studio
   d. Sampling rate

16. Which of the following is NOT a means of increasing the capacity of optical media?

   a. Smaller pits and lands
   b. Increasing laser accuracy
   c. Data formats with lossless compression
   d. Semi-transparent materials

17. Which of the following does NOT pose a danger to user privacy and confidentiality?

   a. EFTPOS
   b. Cookies
   c. Making a phone call
   d. None of the above

18. UTP stands for:

   a. Uniform transfer protocol
   b. Unshielded twisted pair
   c. Unified topology path
   d. None of the above

19. Consider the following text, which arrived in a user's email inbox.

```
/*
** BEGIN PGP MESSAGE
** Version: PGP Personal Edition 8.1.1
*/

dAw6ky8TTfsqGtWbNUESXEMqwxh2vpx7CCeLw7kfs23PB
xHiWeCCEXntw3fYZ4QqXT9xLdRQ7sdDzwcQhPwXUxSoVh
gRJZiioxCp6vcS6LbA2whrVZFhXJBdrgZEKddi7pMYSevsAv5
g7crbDLW7SYf7wqaxVBYvpgQpy5ngnFFQRBQdWcXZ423B
uf4TU4WPwM8xwfNpzAk2T5fKwmBF6gBgw6aP2JuciPiPro
cxcgrsNYgUZ6mXdZDepkMrj3H5zbDPYrdVGgy9pudbi5qjN
eyPb7vA2oEyHhCvzNE7TKhSeYk57cQXQXD3


/*
** END PGP MESSAGE
*/
```

What has happened to the message?

   a. It has been compressed so that it will be sent faster
   b. Its sender has encrypted it for added security
   c. It has become corrupted during the transmitting and receiving process
   d. None of the above

20. A James Ruse student arrives at the Accounts Office in order to make a payment. To ensure that the correct student is identified and the correct item is paid for, the office staff is likely to use which method of data retrieval?

   a. Structured query
   b. Sorting
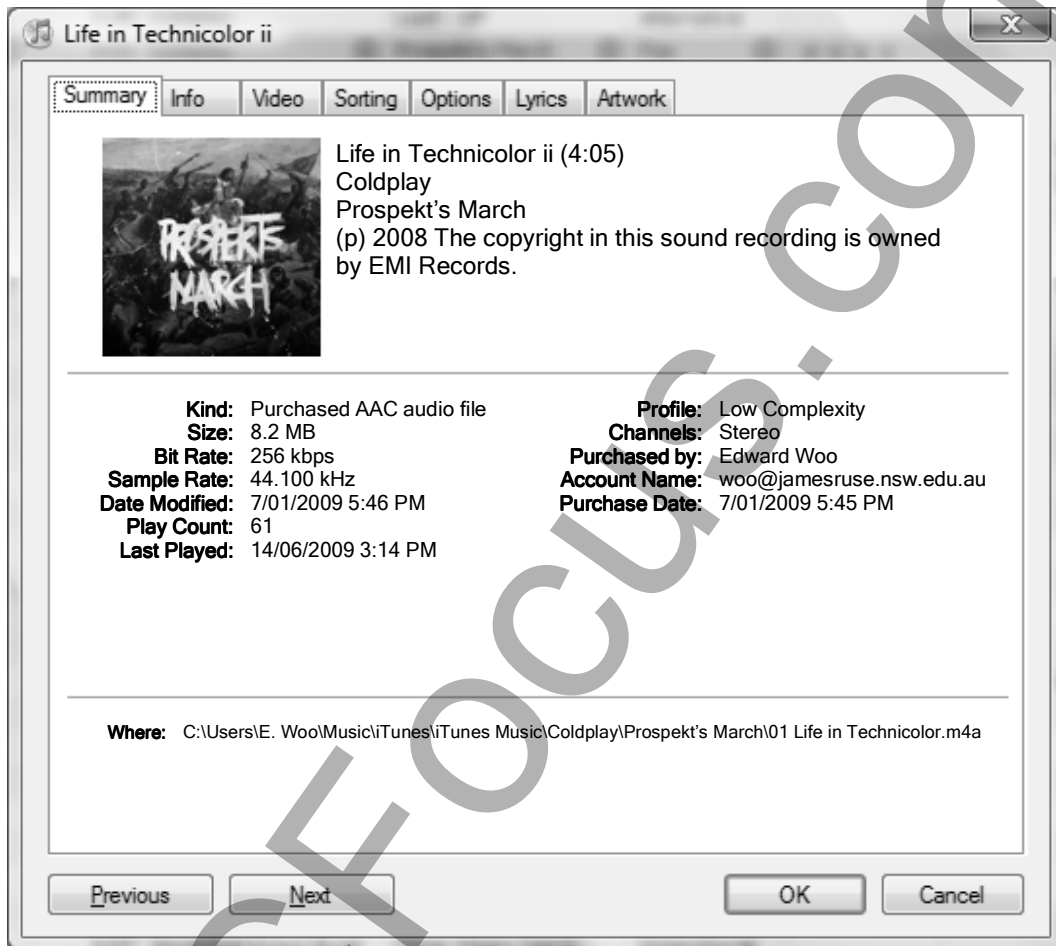   c. Search engine
   d. Indexed list

SECTION B

Extended Answer

QUESTION 21 **[7 marks]**

The screenshot below shows a dialog box from Apple Software's popular *iTunes* program.

Based on the data shown in this screenshot, answer the following questions.

a. The file is listed as an "AAC audio file". What does AAC stand for? **[1]**

b. Distinguish between bit rate and sample rate. **[2]**

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c. iTunes is one of several alternatives for purchasing music as digital media, with no **[4]** physical product involved. Describe the social and ethical issues that are raised by the success of this new market.

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QUESTION 22 [10 marks]

The image below was photographed on a digital camera and then copied to a computer for editing.

figure 1

figure 2

figure 3

figure 4

A crop of the image is shown in figure 1. Figures 2 through 4 have been processed.

a.   Specifically identify the procedure taking place in figures 2 through 4.   **[1]**

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b.   Describe ONE benefit and ONE drawback of processing an image in this way.   **[2]**

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c.   Outline TWO situations in which the benefits of this procedure would outweigh the drawbacks.   **[2]**

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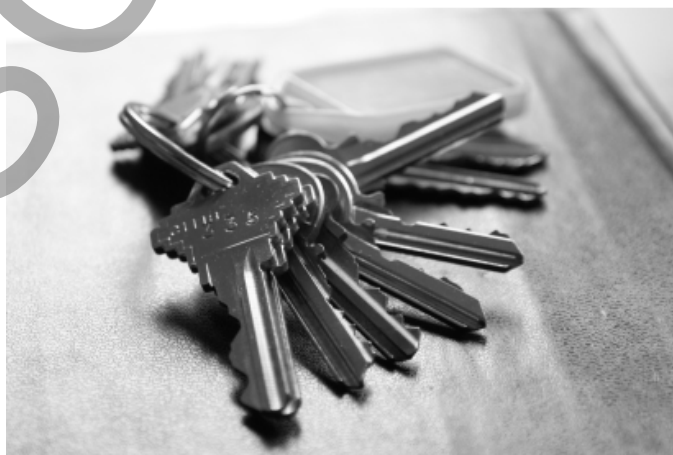
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figure 5

A crop of the image is shown again in figure 5. Figures 6 through 8 have been processed.

d. Generally identify the procedure taking place in figures 6 through 8. **[1]**

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e. Describe the hardware limitations that necessitate the use of this procedure. **[2]**

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figure 6

figure 7

f. Specifically identify the procedure taking place in figure 8, and outline how it functions to create the resultant image. **[2]**

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figure 8

QUESTION 23   **[17 marks]**

The James Ruse Agricultural High School computer network is a complicated information system used by hundreds of people on a daily basis. Not including peripherals such as printers, faxes, modems and surveillance cameras, the network consists of the following nodes:

- A cluster of *servers* (3 file servers, a print server and a proxy server) in the library
- Three *routers* situated in the library, Cameron block and the Technology Wing, connected to all the switches in their respective buildings
- *Switches* in every room with more than three computers
- Large computer labs of *thick clients* in the library and T2.2
- Large computer labs of *thin clients* in T1.5 and T2.3
- Small computer labs of *special-purpose multimedia-editing computers* in C0.2, C2.ML1 (Mini Lab 1), C2.ML2 (Mini Lab 2)

Based on this data, answer the following questions.

a. Identify the most suitable network topology for connecting the library's cluster of   **[2]**
    servers together, and provide justification for this choice.

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b. If the three routers are connected by a bus, draw a diagram representing the   **[3]**
    network topology of the entire school.

c. Classes in the Technology Wing have reported problems with the network, citing extreme delays on computers when all three labs in the Wing are in simultaneous use.
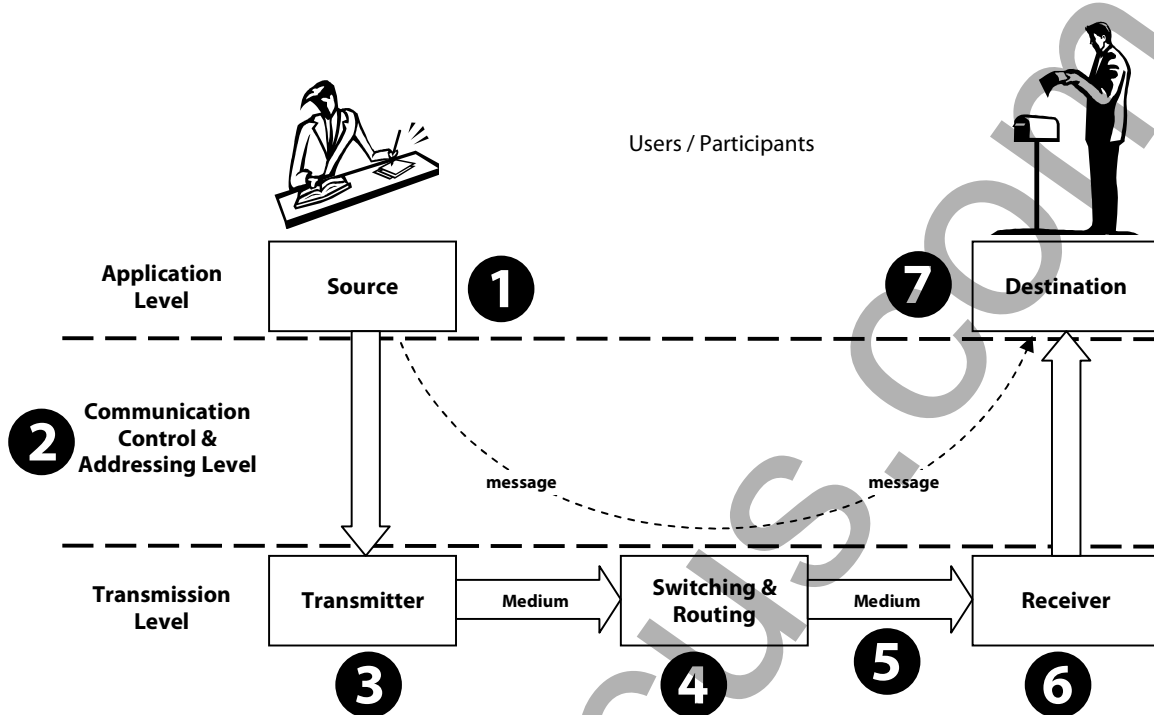
i. Identify the classrooms that will experience the worst delays, and explain why **[3]** this is the case.

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ii. Suggest an appropriate hardware solution to this problem, and provide **[3]** justification for why it would alleviate the problems being experienced.

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d. The school technology committee is considering installing a web server in Co.2, to **[6]** serve streaming video of student-created video projects to the rest of the school network. Identify THREE major problems that could occur as this takes place, and for each potential problem describe a means (either software or hardware) by which these hurdles can be overcome.

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QUESTION 24   **[13 marks]**

Consider the following diagram, which represents a framework for understanding communications between two remote locations.

a. For each of the following items, identify the place where it occurs by writing its number beside it. Items can occur in multiple places; in your answer, include all that apply. **[9]**

Error detection and correction _____

Arrangement of data packets _____

Communication with local exchange _____

Message creation _____

Signal amplification _____

Issuing of data receipt _____

Designation of destination location _____

Handshaking _____

Signal generation _____

b. Suppose that the source of data is a bank client, and the destination is the bank's web server. This web server provides the facility for the electronic transfer of funds, updating of personal details and the creation of new accounts.

    i. Identify the significant item, missing from the list above, that would need to take place in order to ensure the security of the whole process. **[1]**

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    ii. Describe potential ways that a client could be exploited if this item were neglected or compromised. **[3]**

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QUESTION 25 [16 marks]

Epidemiology is the branch of medicine dealing with the incidence and prevalence of disease in large populations and with detection of the source and cause of epidemics of infectious disease[1]. Epidemiologists have had a crucial role recently in the wake of the global outbreak of a new strain of influenza A virus subtype H1N1, commonly known as *swine flu*. Multimedia and communications systems have been crucial in the effective response of international governments and populations to the spread of the infection.

a. Critically analyse the potential uses of multimedia and communications systems to assist in the response to the H1N1 pandemic. (You may include, but not necessarily limit your response to, issues such as: raising awareness, education, diagnosis, analysis of geographical and chronological trends, quarantine, identification of carriers and safe containment of infected patients.) **[10]**

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[1] http://dictionary.reference.com/search?q=epidemiology

a. [continued]

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b. A major hospital is responding to the sharp increase of influenza cases during the winter season, including the possibility of genuine swine flu cases. Recently, a WLAN has been installed over the entire hospital and all staff have been equipped with portable devices capable of connecting to the hospital network, transmitting and receiving audio and video data, and accessing patient records.

Evaluate the benefits of using this sophisticated multimedia and communications **[6]** system against the large cost of installing the system and training staff in how to effectively use it.

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QUESTION 26 [17 marks]

Guatemala scandal centres on president[2]

Long-standing rifts have been reopened in Guatemala by a slain lawyer's video statement that if he were to be killed, President Alvaro Colom and his circle would be responsible.

By Ken Ellingwood
Guatemala City
May 23, 2009

Rodrigo Rosenberg's home-made video may have been low in production values, but it definitely has legs as a riveting political drama.

The 18-minute tape, containing Rosenberg's startling allegations of murder against Guatemalan President Alvaro Colom, has rocked the political world here since its release May 11 – the day after he was slain by unidentified gunmen while bicycling.

Demonstrators this month in Guatemala City seeking the resignation of President Alvaro Colom wield banners with the image of slain lawyer Rodrigo Rosenberg.
Photograph taken by Moises Castillo / Associated Press

The video was published by the police at his funeral, and soon after found its way – complete with subtitled translations – onto public spaces such as YouTube. It depicts Rosenberg, a Guatemala City attorney, sitting in the office of journalist Mario David Garcia talking straight into the camera. He calls out Colom and Colom's Cabinet chief by name. "If you are hearing or seeing this message," says Rosenberg, "it's because I was assassinated by President Álvaro Colom, with the help of Mr. Gustavo Alejos and Mr. Gregorio Valdez."

He goes on to say:

> [translated from Spanish] "I was a forty-seven year old Guatemalan, with four beautiful children, with the best brother one could ask of life, with wonderful friends, and with an overwhelming desire to live in my country. But I could not have lived with myself without rebelling, arming myself with valour and denouncing the real reasons for the deaths of Mister Khalil Musa and his daughter Marjorie Musa before all the Guatemalans who have principles and values, without regarding the consequences, and understanding that my life was in danger, I wanted to leave behind this testimony, should something happen to me, as it unfortunately did."

Rosenberg prophetically addresses the camera, just a few days before his death.
Screen capture taken from YouTube[3]

The case has turned into a gripping whodunit, rife with charges of political corruption and shady financial dealings. It has sparked widespread street demonstrations for and against the president and brought into relief the remaining social divisions of a country still trying to right itself more than a decade after the end of 36 years of violent civil war.

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[2] Reproduced by permission from http://www.latimes.com/news/nationworld/world/la-fg-guatemala23-2009may23,0,5151067.story; sections adapted from http://www.citizentube.com/2009/05/dead-lawyers-video-accusation-causes.html
[3] Viewable at http://www.youtube.com/watch?v=VxZptUp9a44

a. Briefly outline where any 3 of the 7 information processes may have taken place in the context of the creation and distribution of Rosenberg's video. **[3]**

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b. Under the two headings 'communications' and 'multimedia', identify the specific technologies that have allowed Rosenberg's video to achieve its impact. **[6]**

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c. Before the rise of such technologies, broadcasting a message to a wide audience was limited to large organisations (such as governments or media companies) that had access to sophisticated and expensive equipment.

This limitation is no longer valid, with virtually anyone now physically able to attract a global audience to their multimedia content. No limits are placed on the age, location, expertise, political, religious or ideological background of individuals who desire to spread a message. We live in a time where anyone can address the masses through an internationally-viewable blog, podcast or online video channel. Our time could be called the *self-publishing era*.

With reference to the events surrounding Rosenberg's assassination, discuss the social and ethical issues raised by the self-publishing era. **[5]**

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c. In response to this incident, the Guatemalan government is considering implementing a strict censorship policy over the publishing of online content. Propose an argument for or against this policy. **[3]**

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- END OF EXAM -