# X206/201

NATIONAL QUALIFICATIONS 2007

MONDAY, 28 MAY
1.00 PM – 2.30 PM

# COMPUTING INTERMEDIATE 2

Attempt Section I and Section II and **one** Part of Section III.

Section I – Attempt all questions.

Section II – Attempt all questions.

Section III – This section has three parts:

Part A – Artificial Intelligence
Part B – Computer Networking
Part C – Multimedia Technology

Choose **one** part and answer **all** of the questions in that part.

Read each question carefully.

Write your answers in the answer book provided. **Do not** write on the question paper.

Write as neatly as possible.

Answer in sentences wherever possible.

SA X206/201 6/3/8070

## SECTION I

*Marks*

**Attempt ALL questions in this section.**

**1.** Three types of computer are listed below:

**desktop, palmtop, mainframe**

(*a*) Put the three types of computer in order of processing speed, starting with the slowest. **1**

(*b*) Name **one** other type of computer **not** listed above. **1**

**(2)**

**2.** Describe **two** benefits of networking computers. **(2)**

**3.** Floppy disk and hard disk are examples of *magnetic storage media*.

What type of storage medium is a CD-R? **(1)**

**4.** A computer processor is made up of three parts.

Name the part responsible for the temporary storage of data within the processor. **(1)**

**5.** The Internet is a series of interconnected computers throughout the world.

(*a*) Name **one** of the *transmission media* that is used to connect computers on the Internet. **1**

(*b*) When using the World Wide Web, a user can type in the web address of a page they wish to look at.

Suggest **one** other way that a user could go to a web page. **1**

**(2)**

**6.** Jean has compiled a high level language macro into machine code.

(*a*) Explain why the machine code program runs faster than the high level language program. **1**

(*b*) Jean can run the macro by choosing it from a menu.

Suggest **one** other way that she would be able to run the macro. **1**

**(2)**

**7.** State the purpose of a *string variable*. **(1)**

**8.** Using a high level language with which you are familiar, show how you would assign the value 6 to the variable "wage". **(1)**

*Marks*

**9.** A programmer is checking to see if a program is *fit for purpose*.

Which stage of the software development process is being carried out? **(1)**

**10.** The pseudocode shown below uses a *simple condition*.

```
IF age < 5 THEN display "nursery school"
```

Create a *complex condition* that will display "primary school" if a person is between the ages of 5 and 11 inclusive. **(2)**

**(15)**

[*END OF SECTION I*]

**[Turn over for Section II**

## SECTION II

*Marks*

**Attempt ALL questions in this section.**

**11.** Jenna is a computer programmer. She is trying to decide whether it would be better to upgrade her existing computer or to buy a new computer system.

(*a*) What effect would upgrading the processor have on Jenna's computer? **1**

(*b*) Jenna looks at a laptop computer that has an LCD screen.

(i) What does LCD stand for? **1**

(ii) State **two** reasons why a laptop uses an LCD screen. **2**

(*c*) Jenna decides to buy a new computer from her local computer shop. The shop keeps the customer's personal details.

(i) Name the legislation that allows Jenna to see her personal details. **1**

(ii) Under this legislation, describe **one** right that Jenna has other than seeing her personal information. **1**

(*d*) Having bought her new computer, Jenna decides to sell her old computer that she had bought in the year 2005. She has created the following advert to put in the local paper.

FOR SALE

Two year old computer

RAM – 256

Hard Disk – 80

Clock Speed – 2·4 gigahertz (GHz)

Jenna has forgotten to put in the units for storage capacity of both RAM and hard disk.

What units should Jenna have used for:

(i) RAM; **1**

(ii) hard disk? **1**

(*e*) Jenna uses a text editor to enter code to create her programs.

(i) Describe **one** feature of a text editor. **1**

(ii) The documentation that came with the text editor contained a *technical guide*.

Suggest **one** item of information that should be included in a "technical guide". **1**

**(10)**

*Marks*

**12.** The Olympic Games are coming to London in 2012. One of the events will be the 100 metres. A program is being created to control the organisation of the 100 metres.

(*a*) 40 competitors have entered the race. These competitors need to be randomly divided into 5 heats of 8 runners. Part of the algorithm to do this is shown below.

```
2.1   loop 5 times for heats
2.2       loop 8 times for runners
2.3           pick a random runner
2.4           display runner name, heat number, runner number
2.5       end runners loop
2.6   end heats loop
```

(i) Both loops use a *fixed loop*.

Describe why a "fixed loop" is used in this situation. **1**

(ii) The 'runners loop' is completely contained within the 'heats loop'.

What term is used to describe this situation? **1**

(iii) Step 2.3 uses a *pre-defined function* to pick a random runner.

Explain what is meant by the term "pre-defined function". **1**

(iv) The 40 names need to be stored.

What data structure would be used to store the 40 names? **1**

(*b*) As each competitor crosses the finishing line, a photograph will be taken and their time stored by the computer. The winner will be the first person to cross the line.

(i) Which of the following standard algorithms should the program use to decide the winner?

- Input validation
- Finding the maximum
- Counting occurrences
- Finding the minimum
- Linear search **1**

(ii) The photograph is stored as a *bitmap*.

Describe how information is stored in a "bitmap". **1**

(iii) Each pixel in the photograph uses 1 bit of memory. The photograph measures 256 pixels across by 80 pixels down.

How much memory in kilobytes will it take to store each photograph? **Show all working**. **2**

(iv) Describe **one** advantage of saving the photograph using a *standard file format*. **1**

(v) Give **one** reason why hard disk rather than magnetic tape is used as the main backing storage medium. **1**

**(10)**

*Marks*

**13.** Rohit is writing a program that will calculate the amount of memory in kilobytes needed to store a square black and white photograph. The length of the photograph must be between 1 and 8 inches inclusive.

The main steps of the solution are shown below.

1. Take in length of photograph
2. Calculate memory in kilobytes
3. Display memory

(*a*) Show how the above steps would be represented using a *graphical design notation* with which you are familiar. **2**

(*b*) Input validation is required for Step 1. Using a high level language with which you are familiar, write the **program code** that will take in a number and validate that it is between 1 and 8 inclusive. **3**

(*c*) Rohit tests his completed program three times using the test data 5, 6, 7. What type of test data is Rohit using in his tests? **1**

(*d*) When Rohit tries to translate his program, he sees the error messages shown below.

```
Line 4 – missing "
Line 6 – not found
Line 8 – no END statement
```

What type of translator is Rohit using? **1**

(*e*) Rohit fixes all the errors in his code, but before he can save the code, the computer reboots unexpectedly.

(i) Why might Rohit's computer have rebooted unexpectedly? **1**

(ii) Suggest a possible solution to this problem. **1**

(iii) When the computer rebooted, Rohit's program was lost. What part of the computer was storing Rohit's program? **1**

**(10)**

[*END OF SECTION II*]

## SECTION III

**Attempt ONE part of Section III**



Choose **one** part and answer **all** of the questions in that part.

**[Turn over**

## SECTION III

## Part A—Artificial Intelligence

**Attempt ALL questions in this section.**

*Marks*

**14.** Jasmine visits her local computer shop.

(*a*) She is interested in the computer advertised below.

| |
|---|
| 8Mb RAM<br>OS v 5.2<br>320 × 320 colour screen<br>Address book<br>Memo pad<br>Handwriting Recognition Software |

(i) What type of computer is described above? **1**

(ii) Describe what Jasmine may need to do when using the handwriting recognition software for the first time. **2**

(*b*) Jasmine buys a computer game where you design your own robot and then send it into battle against other robots controlled by the computer. Each time Jasmine plays, she finds it harder to win.

(i) What feature should Jasmine include in her robot so that it can detect other robots? **1**

(ii) Explain why this game shows more intelligence than early computer games. **1**

(iii) Describe **one** use of intelligent robots by the military in real life. **1**

(iv) Name the test used to decide if a computer is intelligent. **1**

**(7)**

*Marks*

**15.** YesToFinance is a company that specialises in loans, investments and house sales.

(*a*) YesToFinance uses a software package that learns by being trained with examples. It is then able to predict the answer to similar problems.

(i) What is this type of system called? **1**

(ii) Suggest **one** task for which a finance company could use this type of software. **1**

(*b*) YesToFinance also uses a software package called an *expert system*.

(i) State **two** ways the customer will benefit from an "expert system" being used, rather than a human expert. **2**

(ii) Larger hard drive capacity is one example of a development in technology. Explain why this has allowed "expert systems" to be more effective. **1**

(*c*) Mrs Harris is buying a flat specially adapted for the elderly. It has a *vision system* which can detect if Mrs Harris has fallen and then alert medical services.

Describe how a "vision system" could detect if Mrs Harris has fallen. **2**

**(7)**

**[Turn over**

*Marks*

**16.** A television company is holding auditions for a talent show. The knowledge base below shows some facts and rules about the competitors.

```
1  voice(kabira, excellent).
2  voice(sharon, excellent).
3  voice(ryan, fair).
4  voice(jumoke, excellent).
5  dance(kabira, fair).
6  dance(sharon, good).
7  dance(ryan, excellent).
8  dance(jumoke, excellent).

9  is_selected(X) if voice(X, excellent) and dance(X, excellent).
10 is_reserve(X) if voice(X, excellent) and dance(X, good).
```

(*a*) What would be the result of the following query?

```
? voice(ryan, fair).
```

**1**

(*b*) What would be the first result of the following query?

```
? dance(X, excellent).
```

**1**

(*c*) What would be the result of the following query?

```
? is_selected(kabira).
```

**1**

(*d*) Using the numbering system above to help you, *trace* how the system will evaluate the query

```
? is_reserve(X).
```

as far as the first solution. **4**

**(7)**

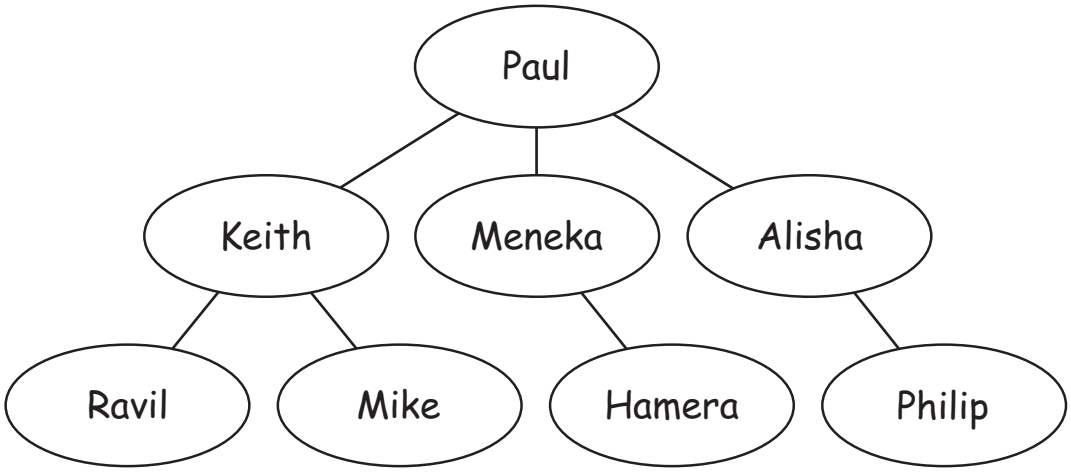
*Marks*

**17.** *Semantic nets* and *search trees* are graphical methods used with knowledge bases. Semantic nets are used to represent knowledge. Search trees illustrate a search through a knowledge base.

(*a*) Draw a semantic net to represent the facts below:

eats(osprey,fish).
is_a(trout,fish).
is_a(salmon,fish). **2**

(*b*) A problem is represented using the search tree below.




The solution to the problem is Mike.

List which nodes will be visited to reach the solution 'Mike' if the search is:

(i) a *breadth first search*? **1**

(ii) a *depth first search*? **1**

**(4)**

[*END OF SECTION III—PART A—ARTIFICIAL INTELLIGENCE*]

## SECTION III

*Marks*

### Part B—Computer Networking

**Attempt ALL questions in this section.**

**18.** A conference attended by Members of Parliament (MPs) is being held in the Ninian Hotel. Susan is a journalist going to the conference where she will be able to access a wireless LAN and the Internet.

(*a*) What hardware will Susan's laptop need so that it can connect to the wireless LAN? **1**

(*b*) Susan logs on to the website for the Ninian Hotel.

| Ninian Hotel | |
|---|---|
| Home<br>Accomodation<br>Restaurant<br>Contact Us | Availability<br>Number of rooms ☐<br>Arrival date ☐<br>Departure date ☐ **Search** |

(i) Susan needs to book one room from 15/08/07 to 17/08/07. Describe how she would check availability using the screen shown above. **2**

(ii) The hotel's website has been designed with four *hyperlinks* appearing on every page as shown above. Explain the advantage of using "hyperlinks". **1**

(*c*) Susan sends an e-mail to her MP to arrange an interview. Susan's e-mail is shown below.

| | |
|---|---|
| To: | alistairlennon@forth.gov.uk |
| From: | susangordon@todaysnews.org.uk |
| Subject: | |

I WOULD LIKE TO INTERVIEW YOU AT THE CONFERENCE. PLEASE CONTACT ME TO ARRANGE A TIME

SUSAN GORDON

(i) Suggest **two** ways that Susan's e-mail may have broken the code of conduct for the use of e-mails at her work. **2**

(ii) Susan receives a reply which is *encrypted*. What will Susan need so that she can read the "encrypted" e-mail? **1**

(iii) Explain **one** feature of the Regulation of Investigatory Powers Act 2000 that applies to encrypted e-mails. **1**

(*d*) At the conference a website explaining e-government is launched.

Describe **one** example of e-government. **1**

**(9)**

*Marks*

**19.** Simon enjoys computer games. His favourite game called Granalan has a multiplayer option that allows him to play against other people on the Internet.

(*a*) The game recommends a *broadband* connection to the Internet.

(i) Explain what is meant by "broadband". **1**

(ii) Suggest **one** reason why a broadband connection would be recommended for the game. **1**

(*b*) Simon accesses a web page which gives tips on how best to play the game.

The URL is:

http:// www.granalan.com/tips/faq.html

(i) What server is hosting this web page? **1**

(ii) What is the name of the file being accessed? **1**

(*c*) The software company that created the game has produced software updates that will fix errors in the program or add extra features to the game. This software is available at the address:

ftp://granalanpatch.com

(i) Simon accesses this address and downloads the updates.

Which Internet service is Simon using? **1**

(ii) Simon can log on to the Internet at work, but he is unable to access this address. Suggest a reason for this. **1**

(iii) What stage of the software development cycle is being carried out when the company produces these software updates? **1**

(*d*) Simon has recently installed new e-mail software on his computer. After installing this software, Simon is annoyed to find that his address book is empty.

(i) State **one** advantage of an address book. **1**

(ii) What should Simon have done to prevent loss of his address book before installing the new software? **1**

**(9)**

**[Turn over**

*Marks*

**20.** Mr Harris repairs gas appliances in people's homes. While in the customer's house he forms a network connecting his laptop, PDA and printer. There are no cables connecting the hardware.

(*a*) What type of network is this? **1**

(*b*) Due to network failure, Mr Harris has difficulty printing a bill for the customer.

Suggest **one** reason that could cause a network to fail. **1**

(*c*) Mr Harris is checking for spare parts on the Internet.

Suggest **one** reason why Mr Harris may prefer to search the World Wide Web using his laptop, rather than using the microbrowser on his WAP phone. **1**

(*d*) The software on the laptop allows Mr Harris to create *macros*.

(i) State **one** reason why Mr Harris would recommend using the "macro" feature. **1**

(ii) When using the gas company's database, Mr Harris can enter his password and then order parts. Suggest **one** reason why Mr Harris should **not** create a macro for the steps needed to reach the ordering stage. **1**

(*e*) Mr Harris tells the customer that *converging technology* can be used when collecting data on gas used and informing the customer of the cost of gas used.

(i) What is meant by "converging technology"? **1**

(ii) Suggest how "converging technology" could be used for the processing of gas bills. **1**

**(7)**

[*END OF SECTION III—PART B—COMPUTER NETWORKING*]

## SECTION III

## Part C—Multimedia Technology

**Attempt ALL questions in this section.**

*Marks*

**21.** Sophie is creating a multimedia CD.

(*a*) The sound quality of Sophie's CD will depend on: *sampling resolution* and *sampling frequency*.

Describe what is meant by the term:

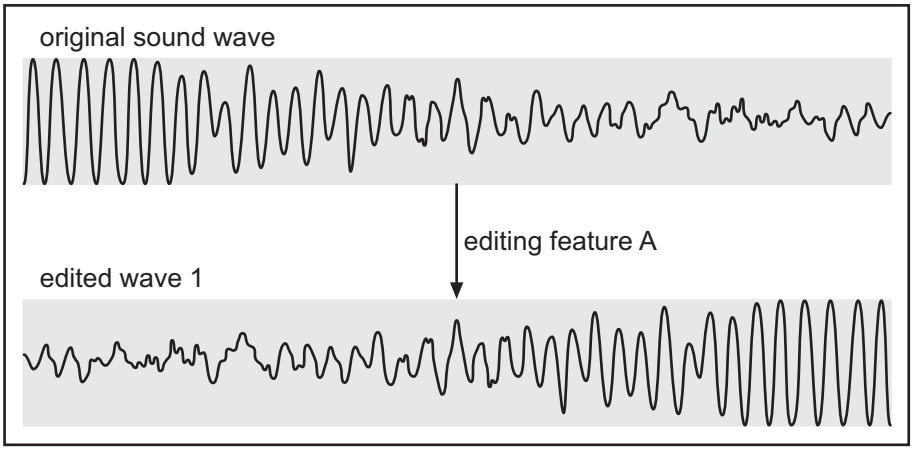
(i) "sampling resolution"; **1**

(ii) "sampling frequency". **1**

(*b*) When Sophie's voice is captured with a microphone, the interface must change the signal so it can be used by the computer. What change must be made to the signal? **1**

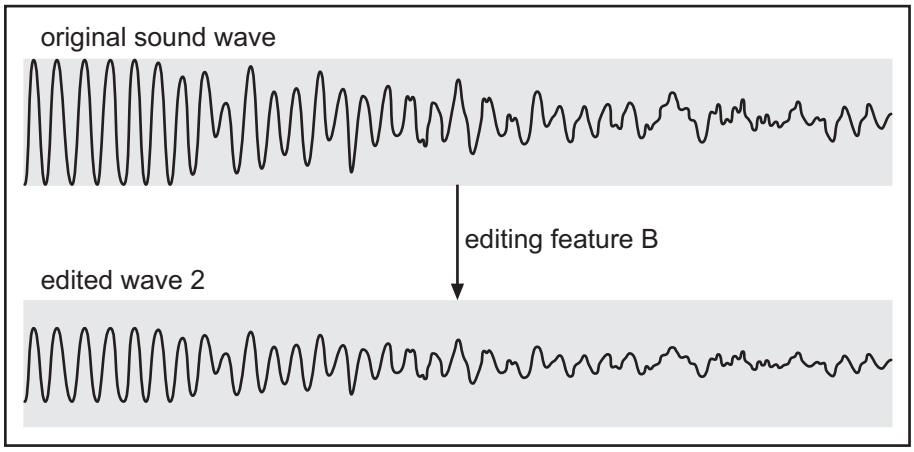
(*c*) The software used to edit Sophie's voice has a number of editing features.

(i) Name editing feature A that changed the original sound wave into edited wave 1 as shown below.




**1**

(ii) Describe how editing feature B was used to change the original sound wave into edited wave 2 as shown below.



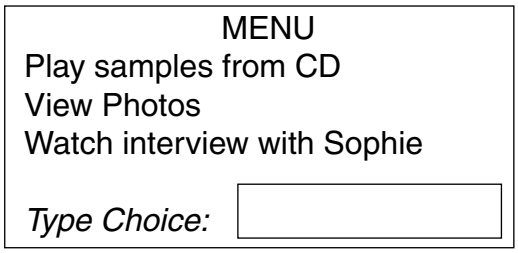

**1**

**21. (continued)**

(*d*) The keyboard track for Sophie's CD has been stored as a MIDI file.

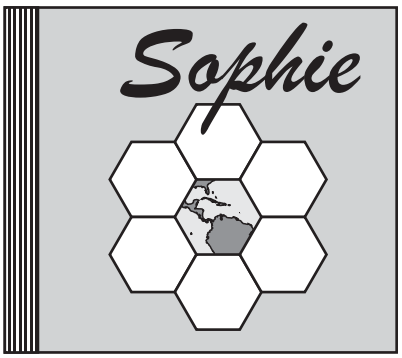
Name **one** attribute of a MIDI instruction. **1**

(*e*) When the CD is inserted into the CD-ROM drive, the following menu appears.

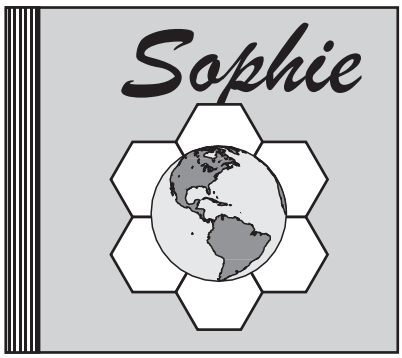



Evaluate the multimedia application in terms of difficulties in using the User Interface. **1**

(*f*) The cover for the CD was created in a vector graphics package. After it had been selling for a year, the cover was edited from CD Cover 1 to CD Cover 2, as shown below.




CD Cover 1




CD Cover 2

(i) What feature of a vector graphics package was used to edit CD Cover 1 to CD Cover 2? **1**

(ii) What file type is likely to have been used to save CD Cover 1? **1**

(iii) The record company wishes to scale the CD cover up to poster size.

Explain why scaling a vector graphic to poster size would not affect printout quality. **1**

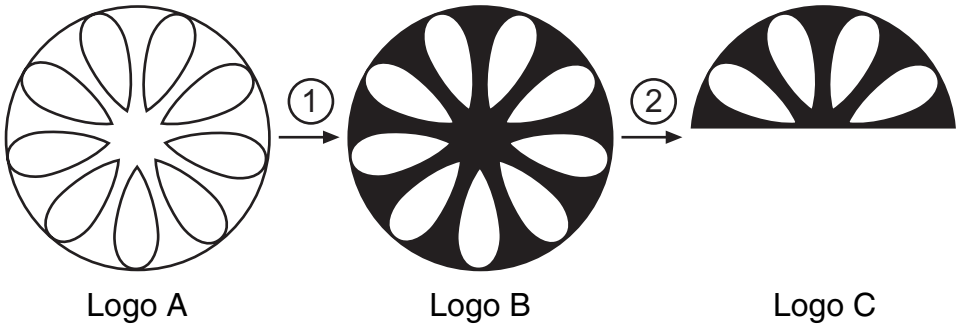
(iv) If the CD cover had been created using a bit-mapped package instead of a vector graphics package, what effect would this have had on the file size? **1**

**(11)**

*Marks*

**22.** Debra has been asked to create a logo for a new gardening show on digital television.

(*a*) Debra created Logo A using a bitmap graphics package then altered it to Logo B and Logo C.




Name the tool that Debra used to alter:

(i) Logo A into Logo B; **1**

(ii) Logo B into Logo C. **1**

(*b*) Debra saved two copies of the logo. She saved one copy as a JPEG file and the other as a GIF file.

(i) State the difference in colour depth between a JPEG file and a GIF file. **1**

(ii) JPEG uses *lossy compression*.

Explain what is meant by the term "lossy compression". **1**

(iii) What type of compression does GIF use? **1**

(*c*) Debra and the television company use identical monitors. When the logo was displayed on the company's monitor, it did not appear as Debra designed it. Suggest **one** possible hardware reason why the logo does not display as designed. **1**

(*d*) Describe **two** tasks that are possible with digital television services that demonstrate the convergence of technology. **2**

**(8)**

**[Turn over**

*Marks*

**23.** Selicon is a video production company that wishes to put samples of their videos on the company web pages.

(*a*) Selicon uses a WYSIWYG web page creator when creating the web pages.

Suggest **one** other type of software they could use to create the web pages. **1**

(*b*) Selicon has received a phone call asking what hardware and software are required to view their web pages. They replied:

- A multimedia computer system
- A modem and Internet Service Provider
- Doors 2005 operating system or better.

(i) Describe the purpose of the operating system software. **1**

(ii) Name **one** type of application software that would be required to view Selicon's web pages. **1**

(*c*) One customer has complained that the videos on the web pages are very jerky when they are played.

In future, how should Selicon alter the settings in the video recording software to ensure the videos are not jerky? **1**

(*d*) As video files take up so much memory, they are compressed using *lossy compression*.

What effect will "lossy compression" have on the video playing time? **1**

(*e*) One of Selicon's employees wishes to make videos at home. She cannot afford a digital video camera.

Suggest **one** other digital hardware device she could use to capture the video. **1**

**(6)**

[*END OF SECTION III—PART C—MULTIMEDIA TECHNOLOGY*]

[*END OF QUESTION PAPER*]

**[BLANK PAGE]**

**[BLANK PAGE]**