

X216/201

NATIONAL
QUALIFICATIONS
2008

MONDAY, 19 MAY
9.00 AM – 10.30 AM

INFORMATION
SYSTEMS
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 – Applied Multimedia

Part B – Expert Systems

Part C – The Internet

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.



SECTION I

Attempt all questions in this section.

1. What type of application software would you recommend to allow users to communicate across the Internet in real-time? **1**

2. Here is the design for a pupil database.

Field Name	Data Type	Sample Data
Forename	text	Lidia
Surname	text	Witkiewicz
Class	text	4B
Subjects	text	English, Computing, Gaelic, Art

State the term used to describe text fields such as *Subjects*. **1**

3. State **two** offences covered by the Computer Misuse Act 1990. **2**

4. What is *on-line* help? **1**

5. Name the object in a spreadsheet that contains a single piece of text, a number or a formula. **1**

6. State **one** security method that may be used by an organisation to ensure a hacker cannot access data. **1**

7.

When travelling to a foreign country it is important to have a passport with you. A passport is a document that identifies you as a citizen of the country that issues the passport.

At an airport or ferry port there is usually someone inspecting passports, and they will use an ink stamp to mark your passport, showing that you have entered a new country.

The diagram above shows a small part of a word processed document.

- (a) Identify **one** data object from the text above. 1
- (b) Name **one** operation that could be performed on this data object. 1
8. Data has to be gathered and stored before it can be processed.
State **two** electronic methods that allow large amounts of data to be gathered. 2
9. State **two** advantages of purchasing music on-line. 2
10. Explain why typing an e-mail message in capitals is seen as poor *netiquette*. 1
11. A piece of computer software offers users menus and keyboard commands to perform various tasks. Explain why the software offers users these different types of HCI. 1

Total for Section I (15)

[END OF SECTION I]

[Turn over]

SECTION II

Attempt all questions in this section.

12. (a) A database is a collection of related information about people or objects. Many databases use manual data storage.

State **three** problems that are associated with manual databases.

3

- (b) State **one** advantage of an electronic database over a manual system.

1

- (c) Two types of computerised database are *flat file* and *relational*.

(i) What is meant by a “flat file” database?

1

(ii) State **two** limitations of a “flat file” database.

2

- (d) *Normalisation* is a process used when a relational database is being designed.

State **three** reasons why “normalisation” is required when using a relational model.

3

(10)

13. The data cards below show part of the database used by a music teacher to keep track of pupils and the instruments they are given.

Pupil ID	023
First Name	John
Second Name	Murnie

Reference No.	Musical Instrument	Make
G78	Guitar	Fenbar
D34	Drums	Gudwig

Pupil ID	058
First Name	Shuna
Second Name	Ali

Reference No.	Musical Instrument	Make
C18	Clarinet	Boyd
R12	Recorder	Sprat

- (a) (i) Normalise the data shown above by removing the multi-value fields. Identify the Primary and Foreign keys.

7

(ii) State the relationship between the entities created in (a)(i).

1

- (b) When the database is implemented, the content of the field *Musical Instrument* is limited to certain values.

Name this validation check.

1

- (c) When the database is implemented, suggest the most suitable field type for *Reference No.*

1

(10)

14. Apple Bay High School has a policy of healthy eating in the school. The school student council wants to publicise the policy.

The student council are to produce a special healthy eating information brochure containing pictures, alongside recipes and nutritional advice.

- | | |
|---|-------------|
| (a) (i) What type of application software would be most suitable for this purpose? | 1 |
| (ii) State two reasons for your answer. | 2 |
| (b) The student council wants to include a picture of the student who won the “best recipe” competition. | |
| What will they have to do before they are allowed to include the picture in the brochure? | 1 |
| (c) The school has a database of all the people who received a copy of the brochure. A local health club requests a copy of the database. Why should the school not supply the database to the health club? | 1 |
| (d) The student council wants to promote their healthy eating policy by creating a website. | |
| (i) What type of application software should be used to construct the website? | 1 |
| (ii) State two advantages to the student council of using a website instead of the brochure. | 2 |
| (e) Some of the families associated with Apple Bay High School are described as being <i>information poor</i> . | |
| (i) Explain what is meant by “information poor”. | 1 |
| (ii) State one disadvantage that arises from this. | 1 |
| | (10) |
| Total for Section II | (30) |

[END OF SECTION II]

[Turn over

SECTION III

Attempt ONE part of Section III

Part A	Applied Multimedia	Page 7	Questions 15 to 16
Part B	Expert Systems	Page 9	Questions 17 to 19
Part C	The Internet	Page 11	Questions 20 to 22

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

SECTION III

PART A—Applied Multimedia

Attempt ALL questions in this section.

15. A low cost air travel company wishes to update its website. This new website will be the only method customers have to book flights.

- (a) Suggest **two** reasons why the company is using the website as the only method of booking flights.
- (b) When booking a flight, the customer sees the following screen.

2

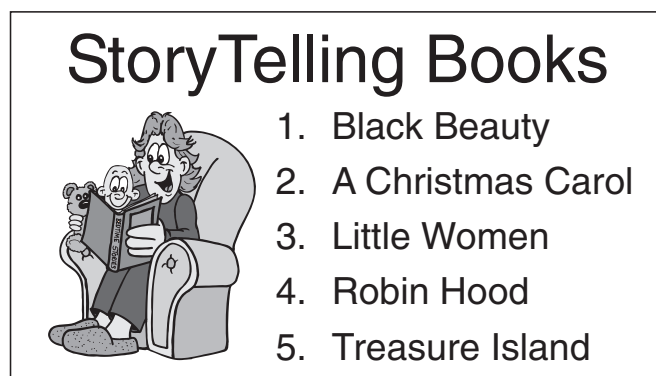
- (i) State the type of search facility shown above.
- (ii) State the type of user interface being used above.
- (iii) State **one** reason why this type of interface has been chosen.
- (c) Once the flights have been chosen, the customer will need to supply their personal details. Which type of user interface would you suggest for this Web page?
- (d) State the job title of the specialist who creates the Web pages for customers to use.
- (e) The company wishes to test the website before it is uploaded to the Internet. A group of customers is asked to test and evaluate the website.
- (i) Explain why the pages need to be tested.
- (ii) State **one** method of testing the website they might use.
- (iii) State the reason why the evaluation would be useful.

(10)

[Turn over

16. Eryn is an audio media specialist. She is working on a *CAL* storybook project. The project is a multimedia program that combines text and pictures with the audio of the stories being read.

- (a) (i) What does “CAL” stand for? 1
- (ii) Suggest **one** reason why an audio recording of the story would make this a better program. 1
- (b) There is limited storage capacity for Eryn’s audio recordings.
Describe **one** method of reducing the storage requirements for the audio recordings. 1
- (c) Laura is the project manager. She wishes audio to be added to the main screen.



- (i) State **two** possible uses of audio on this screen. 2
- (ii) Draw the navigation map for this screen. 1
- (iii) Name this type of navigation structure. 1
- (iv) State which type of multimedia authoring software you would recommend to create this application. 1
- (v) Give **one** reason for your choice. 1
- (d) Each book title has a *link* to a new screen. What is a “link”? 1
- (e) A *Transition* occurs when one screen changes to another.
- (i) What is a “transition”? 1
- (ii) Explain why a “transition” might be used. 1
- (f) Once the program has been completed, various pieces of user documentation are written.
- (i) Describe the purpose of user instructions. 1
- (ii) Explain why hardware and software system requirements are important when buying the program. 1
- (g) Which piece of legislation covers illegal copying of software? 1

(15)

Total for Section III Part A (25)

[END OF SECTION III—PART A—APPLIED MULTIMEDIA]

SECTION III

PART B—Expert Systems

Attempt ALL questions in this section.

17. Dovaphone is a mobile phone company that offers several options to its customers who want a monthly contract. Dovaphone is considering implementing an expert system to help customers select the most suitable option for their needs.

(a) State the category of the proposed expert system. 1

(b) The first stage of developing an expert system is called *knowledge acquisition*.

State **two** methods used for “knowledge acquisition”. 2

(c) Some of the knowledge acquired is represented as the following attribute-value pairs.

Option 1 (minutes=100, text messages=50, WAP bundle=No)

Option 2 (minutes=100, text messages=100, WAP bundle=No)

Option 3 (minutes=100, text messages=100, WAP bundle=Yes)

Option 4 (minutes=200, text messages=100, WAP bundle=No)

Option 5 (minutes=200, text messages=100, WAP bundle=Yes)

(i) Represent the attribute-value pairs as a decision tree. 5

(ii) Who would be responsible for creating this representation during the development of the expert system? 1

(9)

18. Dovaphone provides a range of mobile phones in their shops. The details about the features available on each model are currently held in a database. To help a customer select a suitable phone, the salesperson enters the customer’s answers to a number of questions about their phone needs into the database system.



The company decides to replace the database system with an expert system.

(a) One advantage of an expert system is that it can provide *justification*.

(i) State **two** types of “justification”. 2

(ii) State **two** benefits to the customer of “justification” facilities in this expert system. 2

(b) Compare the output obtained from a database system and an expert system. 2

(c) Describe how the company would test the new expert system. 2

(8)

[Turn over

19. Motor racing cars can have 3 different types of tyres—Slicks, Intermediates or Wets—fitted during a race depending on the weather and track conditions.

An expert system is to be used to indicate the most appropriate tyre selection based on a number of criteria.

Here is the factor table showing the knowledge to be entered into an expert system.

Present Weather	Track Condition	Race Duration Forecast	Tyre Selection
Dry	Dry	Dry	Slicks
Dry	Dry	Rain	Slicks
Dry	Standing Water	*	Intermediates
Rain	Dry	Dry	Intermediates
Rain	Dry	Rain	Wets
Rain	Standing Water	*	Wets

Two of the rules have been written below.

IF Present Weather is Dry
 AND Track Condition is Standing Water
 THEN Tyre Selection is Intermediates.

IF Present Weather is Rain
 AND Track Condition is Dry
 AND Race Duration Forecast is Dry
 THEN Tyre Selection is Intermediates.

- (a) Write the rules required for Wets. 4
- (b) State which component of the expert system is used to store the facts and rules. 1
- (c) The two main methods of inferencing used in expert systems that use production rules are *backward chaining* and *forward chaining*.
- (i) Describe the difference between these methods of inferencing. 2
- (ii) State which method is used in the tyre selection example. 1

(8)

Total for Section III Part B (25)

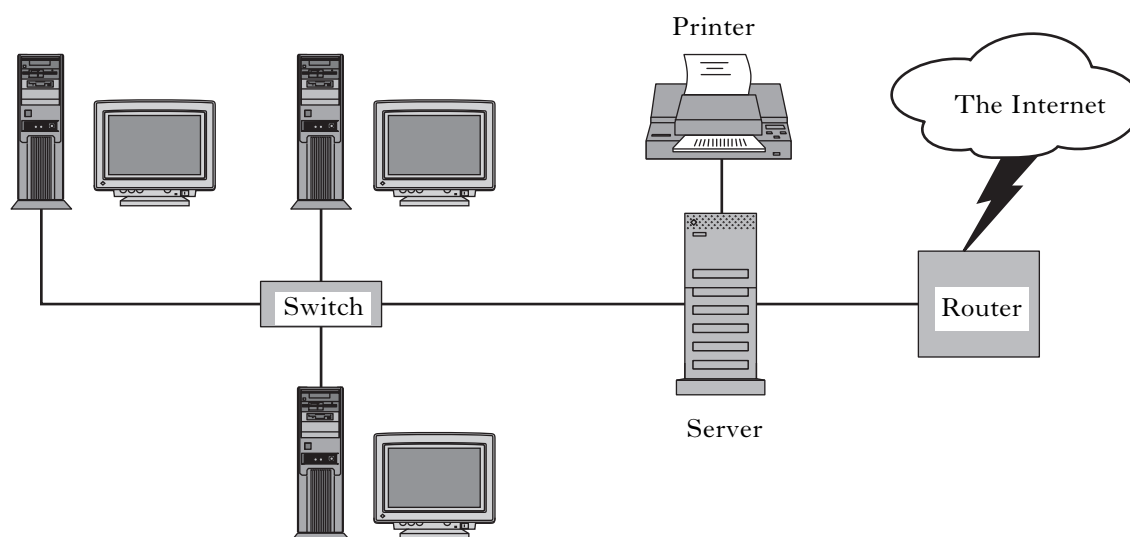
[END OF SECTION III—PART B—EXPERT SYSTEMS]

SECTION III

PART C—The Internet

Attempt ALL questions in this section.

20. This diagram represents part of the network in a school.



- (a) (i) State the purpose of the router. 1
- (ii) State the purpose of the switch. 1
- (b) The school has implemented a *backup strategy*.
Why does the school need a “backup strategy”? 1
- (c) The school’s Internet connection has recently had an increase in bandwidth.
Describe **one** way pupils may notice the increase in bandwidth when using the Internet. 1

(4)

[Turn over

21. Sameer runs a company selling second hand books.

He has registered with an Internet Service Provider and now has access to the World Wide Web and an e-mail account.

- (a) State **two** types of application software he could use to access his e-mail. 2
- (b) Sameer intends to use his e-mail account to help run his business.
 - (i) State **one** way he could use e-mail for business purposes. 1
 - (ii) Describe how this would help in the efficiency of his business. 1
- (c) Sameer wants to use a search engine to find news about auctions in Scotland, but is not interested in auctions in Edinburgh.
 - (i) State a Boolean search that could be used by Sameer to find the information required. 2
 - (ii) Describe **one** feature of an advanced search service that would be useful to Sameer to find the specific information he wanted. 2
- (d) Sameer is using the World Wide Web and e-mail for his business.
 - Name **two** other Internet services that he might use. 2
- (e) As Sameer travels around the country visiting book auctions, he can access the Web and his e-mail using devices other than his computer.
 - State **one** other device he could use to obtain Internet access. 1

(11)

22. Ally is creating a website for Holibobs, a company that sells holidays to its on-line customers.

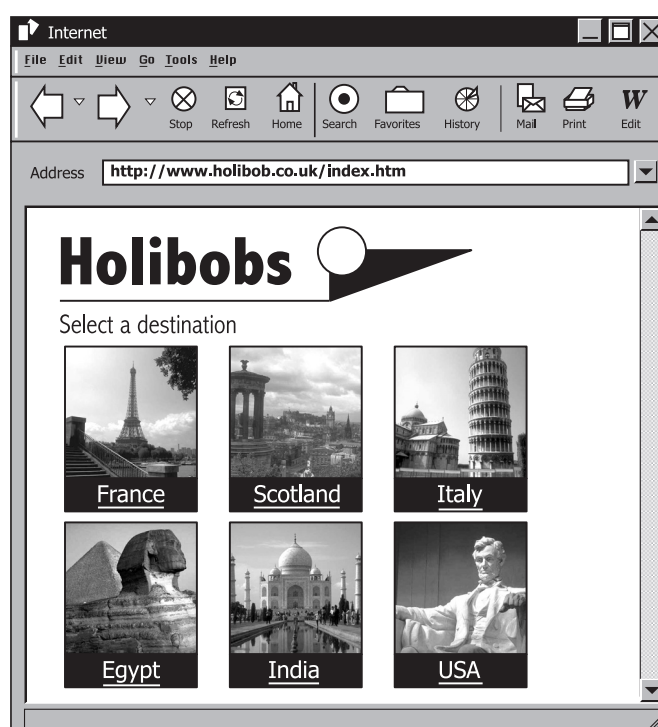
- (a) Ally scans photographs of holiday locations from a book so they can be included on the website.

Ally uses *picture compression*.

(i) What is “picture compression”? 1

(ii) Explain why “picture compression” is required in this situation. 2

- (b) Ally creates this Web page.



Name the legislation Ally must comply with to include the images on the website. 1

- (c) Ally used Web authoring software to create the Web page. One of the features of the software was the *hyperlink tool*.

(i) State the purpose of the “hyperlink tool”. 1

(ii) Describe how Ally used this tool in the Web page shown. 1

- (d) The address of this Web page is <http://www.holibob.co.uk/index.htm>. It uses the *http protocol*. Ally creates a folder in the same directory as the index page to store all the graphics for the Web page. The folder is called *images*. The graphic used for Scotland has the filename **edinburgh.jpg**.

(i) What is a “protocol”? 1

(ii) What is the purpose of the “http”? 1

- (iii) Using absolute addressing, write down the address of the graphic used for Scotland. 2

(10)

Total for Section III Part C (25)

[END OF SECTION III—PART C—THE INTERNET]

[END OF QUESTION PAPER]

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