

X216/11/01

NATIONAL TUESDAY, 7 MAY
QUALIFICATIONS 9.00 AM – 10.30 AM
2013

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

Marks

Attempt ALL questions in this section.

1. Describe the difference between *data* and *information*. 2

2. A company uses an information system for the ordering of goods and billing of customers. The rate at which goods can be ordered and billed is an example of *speed* in relation to this information system.
 - (a) Explain what is meant by the term *volume* in relation to this information system. 1
 - (b) The company has a *network strategy*. Explain why the company requires a network strategy. 2

3. All pupils in a school must sign a *netiquette* form. Describe **one** rule you would expect to find on a netiquette form. 1

4. Prabjit stores information about results from the recent Paralympics. He retrieves the following information about one of the events.

Name	Country	Distance (m)	Qualified
M. Hui	China	34.34	Yes
R. Singh	India	27.00	No
J. Manning	Denmark	34.55	Yes
G. Best	Ireland	34.54	Yes

- (a) Explain what is meant by the term *data retrieval*. 1
 - (b) State the most appropriate data type for **Distance (m)**. 1
 - (c) Describe **one** example of how *data analysis* could be used on the above table. 1

5. *Normalisation* is a process used when a relational database is being designed. State **two** reasons for normalising data. 2

6. A piece of computer software offers menus and keyboard commands to perform various tasks. Explain why the software offers users these different types of HCI. 1

7. Information from a database about the planets is shown below.

Marks

Planet	Diameter (km)	Distance from Sun (million km)	Atmosphere	Water State	Temperature (°C)	Moons
Mercury	5000	60	Sodium Helium	Gas	430	0
Venus	12000	110	Carbon Dioxide Nitrogen	Gas	470	0
Earth	12800	150	Nitrogen Oxygen	Liquid	20	1
Mars	7000	230	Carbon Dioxide Argon	Solid	−20	2
Jupiter	140000	780	Hydrogen Helium	Solid	−150	16
Saturn	120000	1400	Hydrogen Helium	Solid	−180	18
Uranus	52000	2900	Hydrogen Helium Methane	Solid	−210	15
Neptune	50000	4500	Hydrogen Helium Methane	Solid	−220	8
Pluto	3000	6000	Nitrogen Methane Carbon Dioxide	Solid	−230	1

(a) State the term used to describe fields such as Atmosphere. 1

(b) A user searches the database for Water State = Solid and Diameter (km) > 7000.

State how many records would be listed in the search results. 1

(c) The Water State field could have a *restricted choice* validation check performed upon it. Explain what is meant by a restricted choice validation check. 1

(15)

Total for Section I

[END OF SECTION I]

[Turn over for SECTION II on Page four]

SECTION II

Marks

Attempt ALL questions in this section.

8. Rex R Us stores details about used cars for sale in each of its branches in a *flat file* database.

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

2

(b) Some of the data used by Rex R Us is shown below.

Branch ID	Location	Manager	Tel Number	Car Reg	Make	Model	Year	Colour	Price (£)
RX123	Dargour	Alex Corran	00294 236598	AB10 ABC	Missan	Nycra	2005	Red	3500
				CD23 XYZ	Kord	Fa	2006	Blue	2999
				GD34 UHY	Yoyota	Taris	2007	Blue	3750
RX342	Eiloch	Luke Ferry	01365 569854	FE21 GHY	Ria	Kio	2005	Green	2500
				GF29 WER	Golkswagen	Volf	2003	Silver	3500
RX675	Gaillam	Nick McLeod	00147 452754	DC87 DFR	Yoyota	Ocrolla	2005	Red	2750
				SD64 JHG	Missan	Nycra	2006	Grey	3999

The company is advised that a relational database would be more efficient.

Identify and remove the multi-valued fields from the table above and represent the data as two entities with suitable names.

Identify all primary and foreign keys.

7

(c) Rex R Us would like to add a photograph of each car.

State the most appropriate data type that should be used for this field.

1

(10)

9. Each team in the Lowland Hockey League must register players' details with the administrators of the league at the start of the season.

Instead of each club storing details about their players in its own database, the league uses a centralised database.

- (a) State **one** advantage of the Hockey League using a centralised database. **1**
- (b) Name the type of strategy the league administrators should put in place to ensure only authorised personnel have access to the personal information of the players. **1**
- (c) The Lowland Hockey League must comply with the Data Protection Act.
- (i) In terms of the Data Protection Act, identify the data controller in this situation. **1**
- (ii) State **two** responsibilities of the data controller. **2**

[Turn over

9. (continued)

- (d) The Lowland Hockey League uses a spreadsheet application for their league table.

	A	B	C	D	E	F
1	Lowland Hockey League Table					
2	Team	Games Played	Games Won	Games Drawn	Games Lost	Points
3	ROVERS	6	5	1	0	11
4	TIGERS	6	5	0	1	10
5	SPANIELS	7	4	1	2	9
6	CHEETAHS	6	2	3	1	7
7	COLLIES	7	2	3	2	7
8	HUSKIES	7	1	4	2	6
9	TERRIERS	6	2	2	2	6
10	HOUNDS	8	2	1	5	5
11	JAGUARS	7	1	3	3	5
12	LIONS	6	1	3	2	5
13	LEOPARDS	7	1	2	4	4
14	PUMAS	7	1	2	4	4

- (i) Identify the data object in the spreadsheet that holds **all** the information about the COLLIES team. 1
- (ii) Describe **one** formatting function that could be carried out on this data object. 1
- (e) The league table has been sorted into order to show which team is currently winning the league. Describe how the table has been sorted. 2
- (f) After each match, an official observer types a match report and saves this file. Describe how an e-mail application can be used to send the file to the Lowland Hockey League. 1
- (g) The match reports are displayed on the Lowland Hockey League website. Name the **type** of software required to view this website. 1

(11)

10. StellingCo is a company selling goods to customers.

(a) Recently, StellingCo extended the use of ICT in the business and expanded into online sales.

(i) Describe **two** possible effects of new ICT on a business.

2

(ii) Describe **two** ways the use of ICT has changed people's shopping habits.

2

(b) Customers can now view the product database on the website.

StellingCo Quick Shop

Product Type:

Go

(i) Explain how the results for this request are found in the database when the customer clicks the “Go” button.

1

(ii) When the request is carried out, a report showing the camera results is displayed on screen.

Product ID	Make	Model	Price	More details
SC1235695	Sumsang	AB657	£49.95	⇒
SC1236547	Jufifilm	S3421	£49.95	⇒
SC1236985	Nacon	A9870	£55.75	⇒
SC1245244	Sumsang	AB564	£65.00	⇒
SC1235784	Jufifilm	S7855	£67.99	⇒
SC1248510	Nacon	A0008	£72.50	⇒

The product ID field is the primary key. Explain the purpose of a primary key.

1

(iii) The report displayed on the screen does not include **all** the fields from the database. Suggest **one** reason why the report might have been designed in this way.

1

[Turn over

10. (continued)

(c) When a customer buys a product they see the screen below.

StellingCo Order

Product ID

SC1236547

Product Type

Camera

Make

Jufifilm

Model

S3421

Price

£49.95

Quantity

▼

Next

When they click the **“Next”** button, a message appears saying the quantity field has not been completed.

Name the feature used in the database that meant this message was displayed.

1

(d) StellingCo receive several orders from each customer over a period of time. Customer details are stored in a CUSTOMER table and details of orders placed are stored in an ORDER table.

State the relationship that exists between the CUSTOMER table and the ORDER table.

1

(9)

Total for Section II (30)

[END OF SECTION II]

SECTION III

Attempt ONE part of Section III.

Part A	Applied Multimedia	Page 10	Questions 11 to 12
Part B	Expert Systems	Page 15	Questions 13 to 15
Part C	The Internet	Page 19	Questions 16 to 18

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

SECTION III

Marks

PART A—Applied Multimedia

Attempt ALL questions in this section.

11. River Cruises has created a multimedia catalogue advertising their latest cruises for sale. River Cruises intends posting out this electronic catalogue to customers who have previously sailed with them.

The opening screen is shown below.



- (a) Multimedia is used in many different *areas*. State the area where this multimedia catalogue is being used. 1
- (b) State the type of user interface shown in the screen above. 1
- (c) A navigation map shows how each screen is linked to other screens.
- (i) Draw the navigational map for the screen shown above. 1
- (ii) Name the type of navigational structure you drew in part (i). 1

11. (continued)

(d) Before distributing the catalogue to their customers, a group of previous customers were asked to evaluate the catalogue.

- (i) *Fitness for purpose* is checked at the evaluation stage. Explain what is meant by the term fitness for purpose. 1
- (ii) Several members of the group commented on the poor quality of the photo on the opening screen. The photo was scanned again with different settings and the results are shown below.



Original Photo



Re-scanned Photo

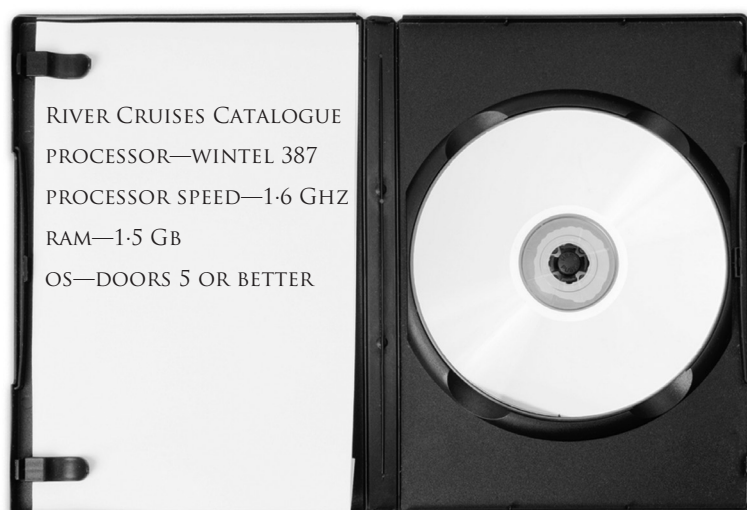
Describe the changes made to the scanner settings that created the re-scanned photo. 1

(e) The catalogue is posted out to previous customers on a DVD-ROM. A CD-ROM has a storage capacity of 700 megabytes.

- (i) State the storage capacity of a DVD-ROM. 1
- (ii) There is a problem with updating the DVD-ROM. Suggest **one** reason why River Cruises may wish to change the information in the DVD-ROM. 1

(f) The multimedia catalogue is sent out in a DVD case as shown opposite.

- (i) State the stage of development when the information in the case would have been created.
- (ii) Explain why it is important this information is included in the case.



12. MobiApps is a company that creates applications (apps) for mobile phones. They are currently creating an app that will allow users to record and playback ringtones.

(a) The project manager is responsible for ensuring that the development progresses within the agreed timescale.

(i) Describe **two** other roles of the project manager during the development of the app. 2

(ii) State the stage of development at which the timescale would have been agreed. 1

(b) MobiApps is choosing an icon to be used in the app. When selected, the icon will take the user to the “Record a new ringtone” screen.

(i) Two icons are being considered.



In terms of the HCI, explain why Icon B would be a better choice rather than Icon A. 2

(ii) When Icon B is selected, a special effect occurs as the screen changes from one to another. State the name given to this special effect. 1

(c) Before a new ringtone is recorded, a window appears allowing the user to choose the *sampling resolution* and the *sampling rate*.

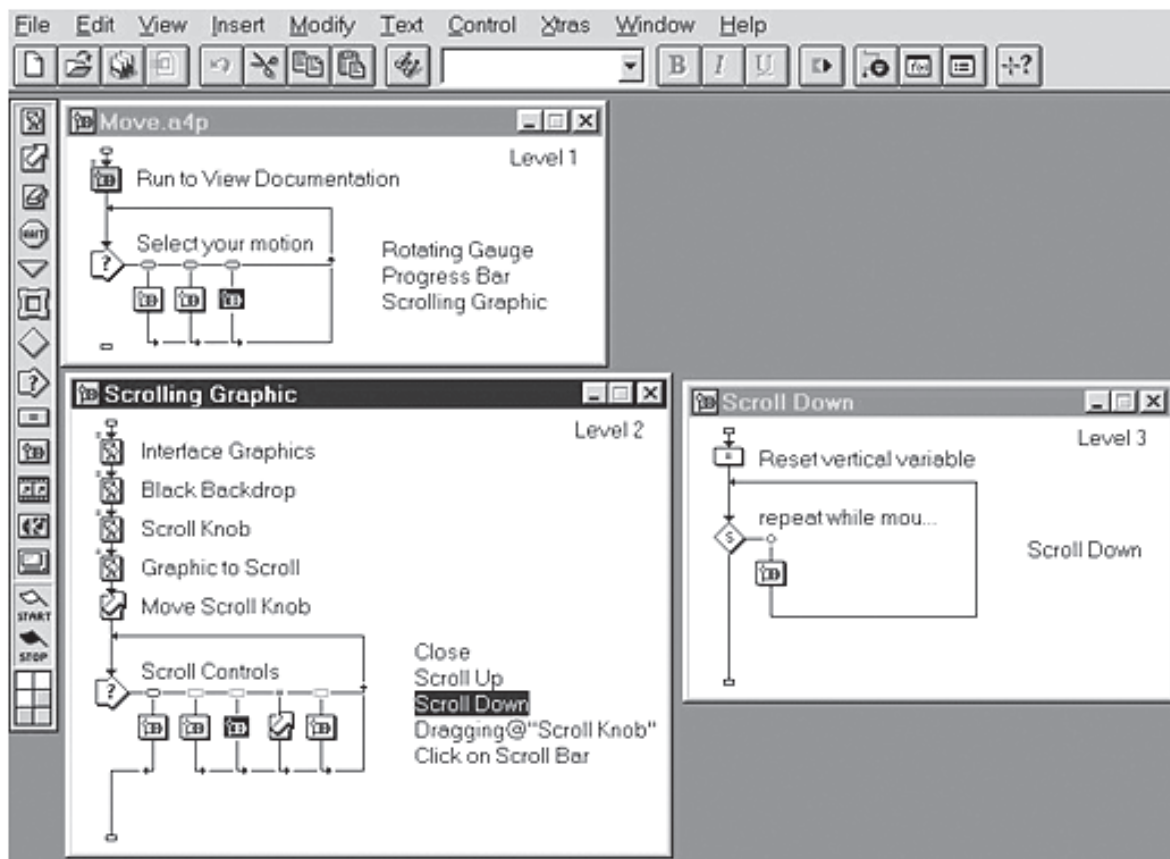
(i) Explain what is meant by the term sampling resolution. 1

(ii) Explain what is meant by the term sampling rate. 1

(iii) After a ringtone is recorded, a number of special sound effects can be applied to it. Describe a common sound effect available in most sound recording software. 1

12. (continued)

- (d) A screenshot from the software being used to create the ringtone app is shown below.



State the **type** of authoring software being used to create the app.

1

- (e) Shown below is the screen for choosing and playing a ringtone.



- (i) Suggest an icon that is missing from the sound panel. 1
- (ii) From the screen above identify an *anchor*. 1
- (iii) Describe **three** navigation tests that should be carried out on the screen above. 2

12. (e) (continued)

- (iv) When the  button is pressed, the following screen is shown.

How to get started

Install the app by downloading and installing it. You may wish to put a shortcut to the app on your main screen.

How to record a ringtone

Select the “Record a ringtone” button. Select the sampling rate and sampling resolution. Select the record button then either sing or play music into the microphone. Press the stop button when you are finished.

How to select a ringtone

Use the arrow keys to take you to the previous or next.

How to play a ringtone

Use the Play button to play the ringtone.

State the general text design principle that has been broken in the screen above.

1

(15)

Total for Section III Part A (25)

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

SECTION III

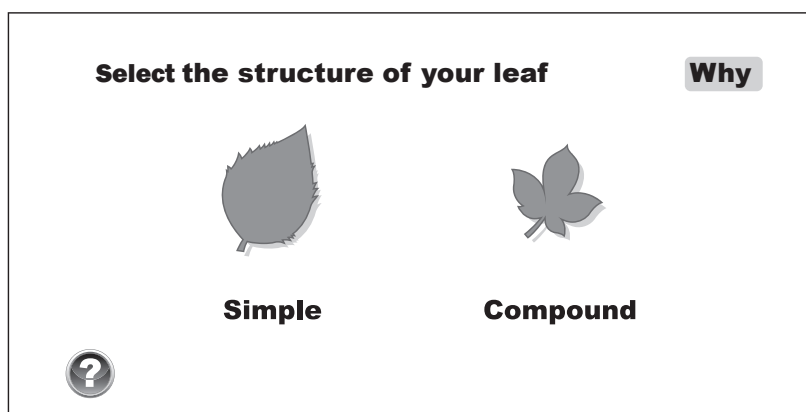
Marks


PART B—Expert Systems

Attempt ALL questions in this section.

13. Woodland Wanders organise hiking trails for school children through forest and woodland at several locations around the country. In the information centre at each location, Woodland Wanders has installed an expert system. The expert system helps children identify the 16 types of trees found across these locations by examining the leaves.

- (a) Describe the purpose of an expert system. 1
- (b) An expert system can be created using an expert system shell.
State **one** component of an expert system shell. 1
- (c) Describe the contents of the knowledge base used by Woodland Wanders. 2
- (d) State the category of the expert system used at Woodland Wanders. 1
- (e) The screen below asks children to choose the structure of the leaf.



- (i) Name the component of the expert system responsible for displaying the screen above. 1
- (ii) The screen includes this icon. 
Name the feature of an application package accessed by clicking on this icon. 1
- (f) When a tree has been identified using the expert system, a link to a database is given to provide further information about that type of tree.
State how many records would be present in the database. 1

(8)

14. Pullah Community College has decided to construct an expert system which will advise people on the night classes which are available, depending on their preferences.

Some of the information about courses offered is shown below.

Carpentry(type=craft, skills=woodworking, level=advanced)

BellyDancing(type=hobby, skills=dance, level=beginner)

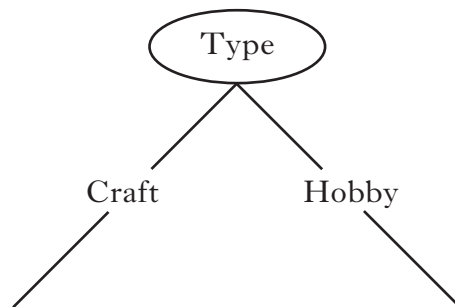
Joinery(type=craft, skills=woodworking, level=beginner)

CreativeKnitwear(type=craft, skills=knitting, level=advanced)

BasicCookery(type=hobby, skills=cooking, level=beginner)

IndianCuisine(type=hobby, skills=cooking, level=advanced)

- (a) Identify the stage of the expert system development cycle when the details about all the courses will be collected. 1
- (b) Describe the role of a knowledge engineer in the development of an expert system. 1
- (c) Use the information above to complete the following decision tree using Type as the root.



4

14. (continued)

(d) System validation is carried out on the full expert system.

(i) Explain how system validation is carried out.

1

(ii) While checking the full expert system works properly the following consultation takes place.

Question 1...

Select the type of course required: **Why**

☐ hobby

☒ craft

☐ sport

☐ language

Question 2...

Select the skills you want to develop: **Why**

☐ knitting

☐ sewing

☒ wood working

☐ jewellery making

Question 3...

Select the level required: **Why**

☒ beginner

☐ intermediate

☐ advanced

State the conclusion reached by the expert system as a result of this consultation.

1

(iii) Explain the purpose of the “Why” button in the consultation.

1

(9)

[Turn over]

15. A company uses an expert system to advise employees how many weeks holiday they are entitled to each year. Marks

Here is a summary of the knowledge used in the system.

Senior management are entitled to 6 weeks holiday plus 2 additional weeks if they are board members. Junior management are entitled to 5 weeks unless they are junior graduate managers in which case they get 1 extra week. Unpromoted staff get 4 weeks if they have been with the company more than 2 years otherwise they get 3 weeks.

- (a) The following rule is used by the expert system to establish the holiday entitlement for a board member.

Rule 1

IF employee IS management

AND level IS senior

AND board member IS true

THEN holiday = 8 weeks.

- (i) State the type of inferencing used in the above rule. 1
 - (ii) Explain why this type of inferencing is suitable in this situation. 1
 - (iii) Write a rule to represent the holiday entitlement for a junior graduate manager. 3
 - (iv) State the component of an expert system that determines the order in which rules are applied and questions are asked. 1
- (b) During the development of the expert system a number of different versions were tried out. Two versions are shown below.

Version 1

Is the employee a manager on the board?
No

Is the employee a senior manager?
No

Is the employee a junior manager?
No

Is the employee unpromoted.
Yes

Version 2

Is the employee . . . ?

☐ management

☒ unpromoted

- Evaluate the **two** versions in terms of the structure of questions. 2
- (8)

Total for Section III Part B (25)

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

SECTION III

Marks

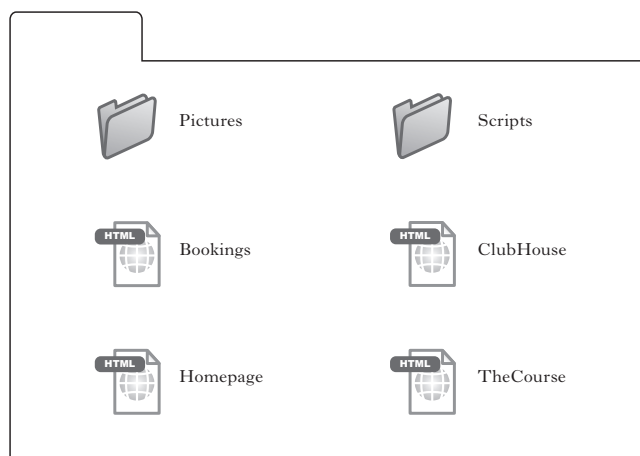
PART C—The Internet

Attempt ALL questions in this section.

16. The homepage and file structure for the Broomhill Golf Club website is shown below.



Broomhill Golf Club Website File Structure (6 Items)



- (a) The homepage contains a Contact hyperlink which works correctly. However, there is no Contact page in the website file structure.

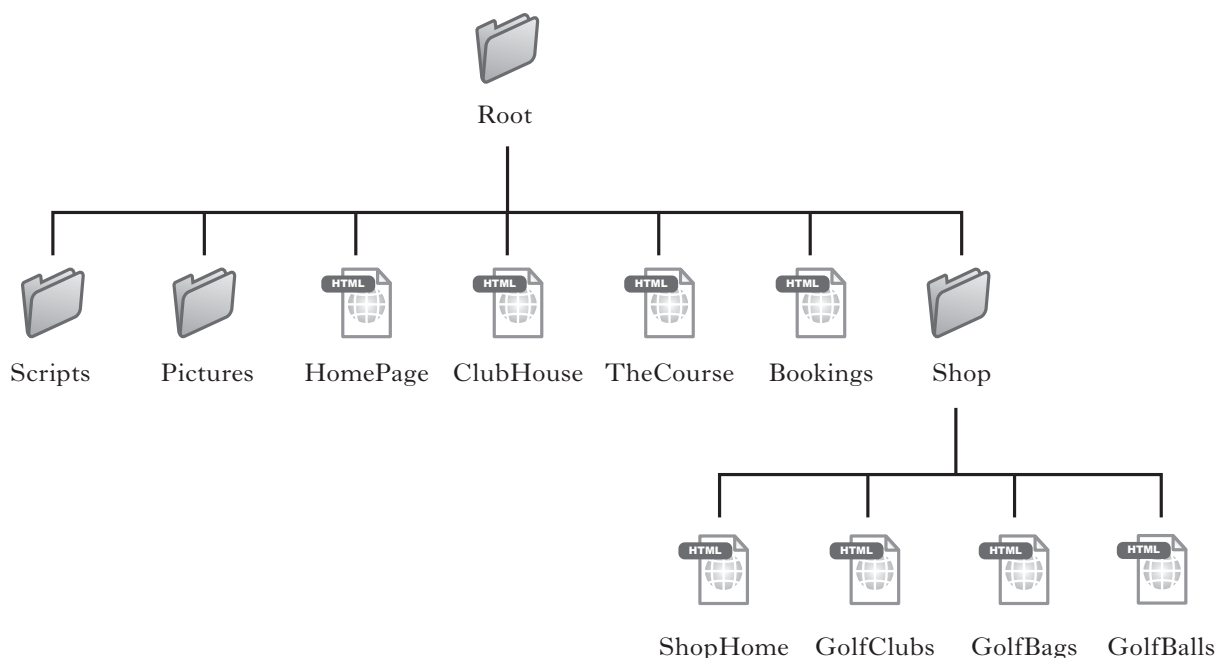
Give **one** reason why the Contact hyperlink works correctly.

1

[Turn over

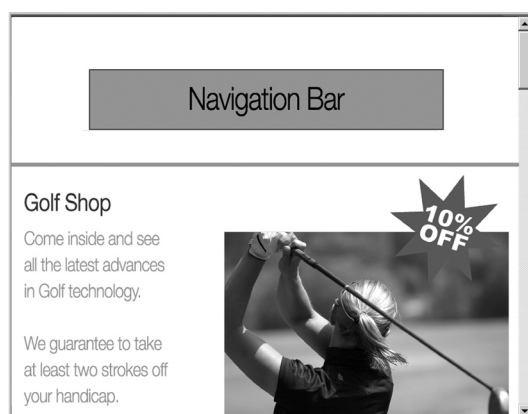
16. (continued)

- (b) The club wish to add an online shop to their website. The structure for the revised website is shown below.



- (i) State the name of the type of filing structure shown for the revised Broomhill Golf Club website.
- (ii) The “Shophome” web page has been created as shown below.

1



The navigation bar does not show enough detail. Draw the navigation bar so it shows all necessary links.

1

- (iii) Visitors to the club website can reach the homepage by typing www.broomhillgolfclub.co.uk.

State the absolute page address of the “GolfBags” web page.

1

16. (continued)

- (c) One of the club members suspects that the website has been hacked. The club has decided to install additional security software and update their virus protection software.
- (i) State the legislation that would have been broken by hacking into the golf club website. 1
 - (ii) The additional security software continually checks network activity to see if anyone is trying to hack into the website. Explain the effect this would have on *system performance*. 2
 - (iii) Explain why virus protection software needs to be updated regularly. 1
- (d) Another member has taken a photograph of Phil Mickelson, a famous golfer. She has suggested that the club put the photograph on the club's homepage to try and attract new members by making them think that Phil Mickelson plays at the club. It has been decided not to include the photograph.
- (i) The photograph takes up 10 megabytes of storage. Describe **one technical** reason why the club has decided not to include the photograph. 1
 - (ii) The club was not happy that they could have deceived people into thinking that Phil Mickelson played at their club. State whether this is a social, professional, legal or ethical implication of the use of Information Systems. 1
- (10)**

[Turn over]

17. Isabel has never used a computer or the Internet. She has just bought herself a new laptop and is hoping to use it to browse the web, do online shopping, and communicate with friends online.

(a) Describe **two** ways in which Isabel could consider herself *information rich* despite having never used a computer.

2

(b) When Isabel signs up for an Internet Service Provider, she has to fill in the following form:

Welcome to **MinusNet**
Please complete the form

Username:

Password:

Date of Birth:

Ethnic Origin (White, Hispanic, Asian, etc):

Submit

Explain why Isabel might not wish to fill in the Ethnic Origin part of the form.

1

(c) When Isabel submitted her details she got the following message:

Sorry, the username Isabel has already been taken. You can have Isabel257 or you could try another username.

(i) State the type of application that is most likely to be storing the user information.

1

(ii) Explain why the username must be unique.

1

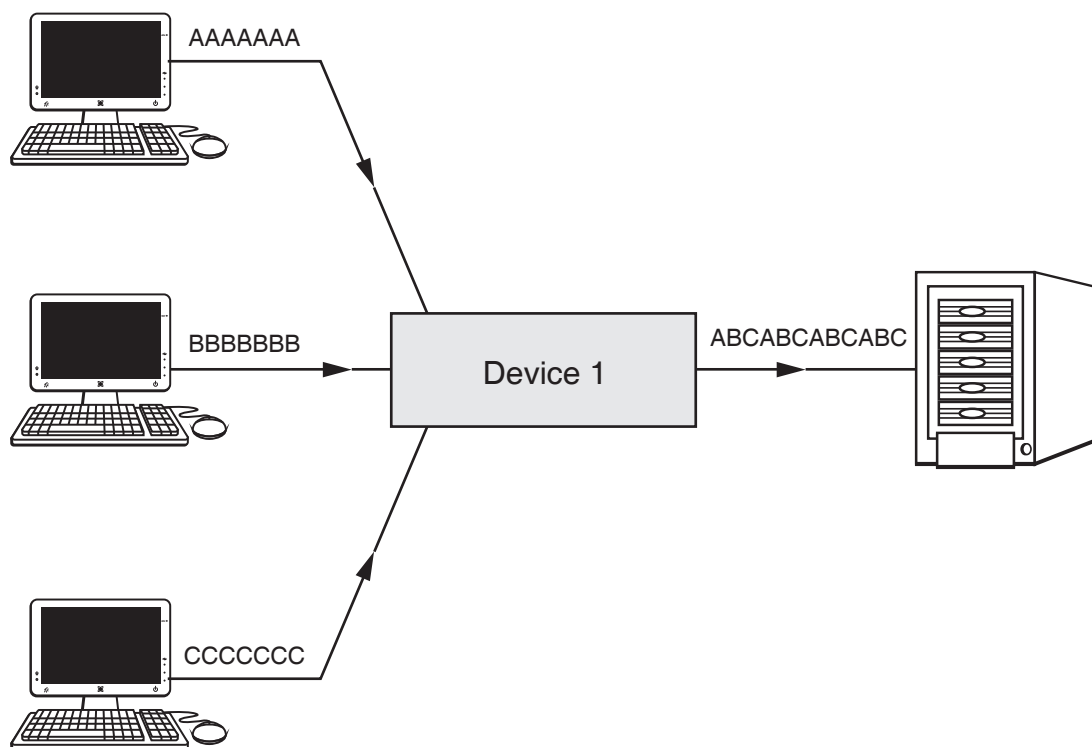
(d) Isabel's ISP provides her with a choice of *chat* or *newsgroups* as a means of communicating with others. Describe **two** differences between chat and newsgroups.

2

(7)

18. Navco is a system that allows multiple users to simultaneously use Navco's advanced search engine.

(a) The diagram below represents part of the Navco network.



- (i) State the type of device shown in the diagram as Device 1. 1
- (ii) Explain the purpose of Device 1. 2
- (b) Communication between the different devices on the network uses TCP/IP. State what TCP/IP stands for. 2

[Turn over

18. (continued)

- (c) One of the features of Navco's advanced search engine is the ability to use Boolean operators.

- (i) Describe **one other** feature of an advanced search engine. **1**
- (ii) A user is trying out different Boolean operators with the search items Brown Bear. The results from his searches are shown below:

Criteria	Boolean operator	Criteria	Number of hits
Brown	AND	Bear	204,300
Brown	X	Bear	347,800
Brown	Y	Bear	593,400

- (A) State the Boolean operator that should be entered into Box X shown above. **1**
- (B) State the Boolean operator that should be entered into Box Y shown above. **1**

(8)**Total for Section III Part C (25)**

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

[END OF QUESTION PAPER]