X216/201

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.

SQA

SECTION I

Attempt ALL questions in this section.

1. Define the term *data*. **1**

2. A student uses a DVD encyclopedia to research the solar system. What type of application software is a DVD encyclopedia? **1**

3. A mail order company uses a relational database to store information about the items it sells and who buys them. Suggest a suitable name for one of the tables in the database. **1**

4. A field containing a numeric value can either be an *integer* or a *real* data type.

(*a*) Describe what is meant by an "integer" data type. **1**

(*b*) Describe what is meant by a "real" data type. **1**

5. Describe **one** example of how an organisation makes use of word processing software. **1**

6. State **one** limitation of storing data in a flat file database. **1**

7. Part of a database and part of a spreadsheet are shown below.

Database

Record 1	
Ref No	C146
Item	Cola
Quantity	10
Price	£0·50

Spreadsheet

	A	B	C	D
1		**Product List**		
2				
3	Ref No	Item	Quantity	Price
4	C146	Cola	10	£0·50
5	C123	Crisps	10	£0·50
6	J123	Juice	20	£0·40
7	S254	Mints	15	£0·25
8	S265	Chocolate	12	£0·45

Name the data object in the spreadsheet that holds the same information as the record in the database. **1**

8. A national organisation supplying electricity to its customers uses an information system to calculate electricity bills because it can process a large *volume* of data.

   Describe **one other** reason for using an information system to calculate electricity bills. **1**

9. Describe **one** action relating to **seating**, that an employer should implement to ensure the health and safety of employees using computers. **1**

10. State **two** reasons for normalising data. **2**

11. A school keeps details about pupil attendance in a database.

    (*a*) The school prints a list of absent pupils similar to the one shown below.

Daily Absentee List		2nd September
Forename	**Surname**	**Class**
Nisah	Ali	2A
Sally	Abbot	2B
Jamie	Chalmers	2A
Jurgen	Schumacher	2A
Joyce	Watson	1D
Mo	Williams	3E

    State the correct term for this printed list from a database. **1**

    [Turn over

11. (continued)

(*b*) During registration, a teacher enters the absentees directly into the system on the screen shown below.

Attendance Check						
Class 2a						
Teacher Mr Rae						
		September				
Surname	**Forename**	02–Sept	09–Sept	16–Sept	23–Sept	30–Sept
Ali	Nisah	X				
Amokatchi	Nwankwo					
Ashcroft	Liam					
Barnes	Francesca					
Chalmers	Jamie	X				
Dziekanowski	Piotr					
Jones	Ciaran					
Le Pen	Thierry					
Schumacher	Jurgen	X				

State the correct term for this type of screen. **1**

12. Computers give easy access to information systems. Describe **one other** way to gain easy access to information systems. **1**

Total for Section I (15)

[*END OF SECTION I*]

SECTION II

Attempt ALL questions in this section.

13. XtrenIS is setting up a new information system to help run their business. XtrenIS has several branches throughout Scotland.

(*a*) XtrenIS requires a new software package but are unsure which one to buy.

The *range of data objects* available in a package is one feature that can be used to evaluate a software package.

Name **two other** features that could be used to evaluate software packages. **2**

(*b*) XtrenIS has been advised to implement a *security strategy*.

Describe **two** reasons why a company requires a security strategy. **2**

(*c*) XtrenIS is keen to use a *centralised database*.

Describe **one** advantage of having a centralised database in an organisation instead of separate copies stored on different computers. **1**

(*d*) XtrenIS sent out the following letter to customers advising them of changes.

<div style="border:1px solid black; padding:1em;">

113 Greendale Estate
Waterside
WA23 5YT

Dear Customer

As a valued customer, we want to keep you up to date with some of the proposed alterations to the way we run our business.

A new information system is to be installed. This new system will involve a centralised database for customer accounts, ***improved data security*** and ***improved customer ordering service***.

We will be providing the same products and fine service on which we have built our reputation in the industry.

</div>

Identify **two** formatting functions used in this letter. **2**

(7)

[Turn over

14. Wilderness Adventures is a summer camp that employs a number of instructors to run courses for guests. Here is an example of the data stored about each instructor and the courses they run.

Instructor ID	INS186		
Firstname	Joe		
Surname	King	**Photograph**	

Course Ref	Description	Level	Day course runs
SL101	Sailing	Beginner	Monday
SL103	Sailing	Advanced	Tuesday
KY104	Canoeing	All levels	Wednesday

(*a*) Identify and remove the multi-value fields from the table and represent the contents as two entities with suitable names.

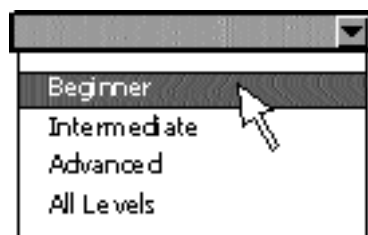Clearly indicate the primary and foreign keys in the tables. **7**

(*b*) The personal details of each instructor are stored in the information system.

In terms of the Data Protection Act, who is the *data controller* in this situation? **1**

(*c*) Wilderness Adventures runs a website to advertise their courses and take bookings. The user can obtain a list of the courses available from the website.

(i) The user can only select the level of a course from a list like this:

Beginner
Intermediate
Advanced
All Levels

State the type of validation used in this situation. **1**

14. **(*c*)** **(continued)**

(ii) Each day, Wilderness Adventures obtain a list of bookings similar to the one shown below.

Camper Number	Forename	Surname	Gender	Age	Course Ref
WA1287	Dominika	Adamczyk	Female	15	SL201
WA1007	Sally	Harkins	Female	16	KY101
WA1034	Arabella	Young	Female	14	RK101
WA1109	Jack	Greer	Male	15	AB101
WA1145	Jose	Sanchez	Male	17	SL101
WA1089	Dylan	Whitehead	Male	16	CA101
WA1345	Hussein	Zubar	Male	15	KY201

Describe how the above list has been sorted. **2**

(iii) The booking list makes use of *primary keys* and *foreign keys*.

Explain what is meant by a "foreign key". **1**

(*d*) Electronic databases can sort data into order very quickly.

Describe **two other** advantages of using an electronic database instead of a manual database. **2**

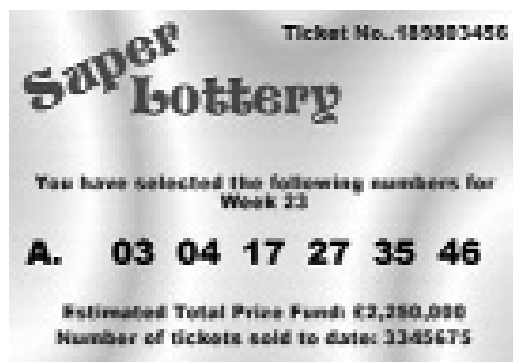(*e*) The user interface used on the website makes the electronic database *user friendly*.

Describe **two** other features to be considered when designing the user interface. **2**

(16)

[Turn over

15. Super Lottery uses a computerised information system. Players can buy tickets for the Super Lottery from shops around the country.

(*a*) The functions carried out by the system are *gathering, processing, storing* and *outputting* information.

(i) Describe **one** piece of information gathered by the system. **1**

(ii) Describe **one** method that could be used for entering data into the Super Lottery computer system. **1**

(iii) Outputting information can be done in several ways.

Describe **one** method of output that may be used in the Lottery system. **1**

(iv) The computerised information system used by Super Lottery carries out a lot of processing.

Describe **one** process that may be carried out in the Lottery system. **1**

(*b*) Super Lottery is considering selling tickets online.

(i) Describe **one** advantage to players of the Super Lottery of buying their tickets online rather than from a shop. **1**

(ii) Describe **two** implications for Super Lottery of selling their tickets online rather than from a shop. **2**

(7)

Total for Section II (30)

[*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

PART A—Applied Multimedia

Attempt ALL questions in this section.

16. Argus, a high street catalogue shop, decides to replace their in-store catalogues with multimedia information screens.

    (*a*) Two designs for the user interface of the information screens are shown below.

Design A

Browse Argus	
1	TV & DVD
2	Kitchen Appliances
3	Photo & Camcorders
4	Gaming Software
5	Audio Products
	Type the number of the option you wish:

Design B

Browse Argus	
1	TV & DVD
2	Kitchen Appliances
3	Photo & Camcorders
4	Gaming Software
5	Audio Products
	Type the number of the option you wish:

       (i) State the type of user interface being used above. **1**

       (ii) Argus decided to use Design A. State **two** reasons, relating to text design principles, why Argus might prefer Design A. **2**

    (*b*) When the user moves from one screen to another, a "dissolve" effect occurs.

       (i) State the term used to describe a special effect occurring between screens. **1**

       (ii) Explain why Argus uses special effects when changing screens. **1**

    (*c*) Each of the 25,000 products in the multimedia catalogue requires a photograph to be stored. This has made the file size of the catalogue very large.

       It has been decided to alter the photos **without compressing them**.

       (i) Describe the method used to reduce the file size of Photo 1 to give Photo 2 that is shown below. **1**

Photo 1   Photo 2

       (ii) Explain how the method you described in part (i) reduces the file size of the photo. **1**

16. (continued)

(*d*) The multimedia catalogue is updated as stock is sold so that customers know how many are left in the store.

The WWW could be used as the delivery medium. State **one other** delivery medium that could be used in this case. **1**

(*e*) The local newspaper is creating an online article reporting on the Argus shareholders meeting. A small part of two versions of the article are shown below.

Version 1

Argus reports record profits

"2010 has been the best year yet," reported Jim Aitchinson chairman of Argus. A smiling Jim addressed shareholders at yesterdays meeting to report record profits of £8·4 million.

Version 2

Argus reports record profits

"2010 has been the best year yet," reported Jim Aitchinson chairman of Argus. A smiling Jim addressed shareholders at yesterdays meeting to report record profits of £8·4 million

Jim Aitchinson

(i) State **two** graphic design principles that have been used when changing Version 1 into Version 2. **2**

(ii) In both versions, the photograph is an *anchor*. Describe what is meant by the term "anchor" in this situation. **1**

(11)

[Turn over

17. Blah is a digital audio player application. It allows users to store music and album art on a home computer.

(*a*) A typical screen contains the information on one album. The screen should contain the name of the album and the artist who recorded it, as well as a picture of the album cover and navigation buttons to move between albums.

Draw a labelled storyboard showing all of the above screen design elements. **3**

(*b*) When music files are captured to be stored using Blah, the user can choose from a range of *sampling rates*.

Describe what is meant by the term "sampling rate". **1**

(*c*) Many users of Blah download music files from the Internet without permission.

Name the piece of legislation they may have broken. **1**

(*d*) Blah allows users to search for music files.

State the type of search facility illustrated below.

Title	**Artist**	
Watch	The midges	**Find**

1

(*e*) A digital audio player application is an example of multimedia used at home.

State **one** other use of multimedia at home. **1**

(*f*) The digital audio player application comes with *online help*.

Describe "online help". **1**

(8)

18. Netastik are creating a multimedia application to promote their business.

   (*a*) When creating the multimedia application Netastik have to take account of the *audience* who will be using the application.

      (i) Describe **one** issue about the audience that Netastik should take into account when creating the application. **1**

      (ii) Describe a solution to the issue you identified in part (i). **1**

   (*b*) State the job title of the person who organises the development of the application and ensures that it is created on time and on budget. **1**

   (*c*) Netastik has a choice of using an *icon-based* or *scripting* authoring package to create the multimedia application. Netastik have chosen to use the icon-based authoring package as it was easier to use.

     Describe why an icon-based authoring package is easier to use than a scripting authoring package. **1**

   (*d*) During the testing stage, a *screen test* will be carried out. Explain the purpose of a "screen test". **1**

   (*e*) Netastik evaluate the mulitmedia application in terms of *fitness for purpose*.

     Describe one method they could use to evaluate fitness for purpose. **1**

                                                                 (6)

                      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.

19. Money Matters is an expert system used by university students to find out ways to earn money. The expert system asks questions to find out about the students' interests and free time. The students enter their responses and the software displays jobs they may be interested in.

(*a*) Describe **two** purposes of an expert system. **2**

(*b*) When the Money Matters expert system was created, an *expert system shell* was used. Describe what is meant by the term "expert system shell". **1**

(*c*) State the category of expert system that Money Matters belongs to. **1**

(*d*) During the consultation, the following screen is displayed:

> Q: Is playing sport your favourite way to spend your free time?
> A: Yes
> Q: Is going to the cinema your favourite way to spend your free time?
> A: No
> Q: Is eating out your favourite way to spend your free time?
> A: No

Suggest a more efficient method of getting the same information. You may use a diagram in your answer if you wish. **2**

(6)

20. Cheap and Cheerful are producing recipe sheets for university students. They wish to provide students with cheap tasty recipes. They decide to create a recipe expert system.

(*a*) There are three stages in creating an expert system. The first stage is knowledge acquisition. State the **other two** stages. **2**

(*b*) During the creation of the recipe expert system, a number of personnel will be involved. The domain expert will provide information about the recipes and foods.

   (i) State **one other** person involved in the creation of the expert system. **1**

   (ii) Describe the role of the person you identified in part (i). **1**

(*c*) When the expert system is complete and working, it gives the user *How* and *Why justification facilities*.

   (i) At what point during the consultation of the recipe expert system would the "Why" facility be used? **1**

   (ii) Describe the purpose of the "How" facility in the recipe expert system. **1**

(6)

[Turn over

21. TakeitEasy is a holiday company using an expert system to help customers decide where to go on holiday. Some of the rules from the expert system are shown below.

> IF price range IS expensive
> AND likely weather IS hot
> AND activities ARE scuba diving
> THEN destination IS Barbados.
>
> IF price range IS medium
> AND likely weather IS mixed
> AND activities ARE sight seeing
> THEN destination IS Prague.
>
> IF price range IS cheap
> AND likely weather IS rain
> AND activities ARE donkey riding
> THEN destination IS Blackpool.
>
> IF price range IS expensive
> AND likely weather IS snow
> AND activities ARE skiing
> THEN destination IS French Alps.
>
> IF price range IS expensive
> AND likely weather IS hot
> AND activities ARE sight seeing
> THEN destination IS Rome.

(*a*) When writing the rules, the creators had a choice of inferencing methods they could use.

  (i) State the type of inferencing used in the above rules. **1**

  (ii) Explain why the creators of the expert system used this type of inferencing in this situation. **2**

  (iii) Describe **one** feature of the *inference engine*. **1**

(*b*) Mr Hamid wants a holiday which will be expensive and where the likely weather is hot and he can do some sight seeing. State the destination the expert system would recommend. **1**

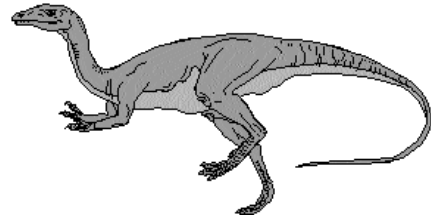(*c*) Instead of using an expert system, TakeitEasy could have created a database to store this information.

State how many fields the database would have. **1**

(*d*) Compare the way TakeitEasy staff would find suitable holiday destinations using an expert system and a database. **2**

(8)

22. The National History Museum collects information on dinosaurs.

Some of the information is represented as the following attribute-value pairs:

Guanlong (eats meat = Yes, runs fast = Yes, no of legs = 2)
Saltopus (eats meat = Yes, runs fast = Yes, no of legs = 4)
Byteosaurus (eats meat = Yes, runs fast = No, no of legs = 4)
Diploducus (eats meat = No, runs fast = No, no of legs = 4)
Graciliceratops (eats meat = No, runs fast = Yes, no of legs = 2)

Represent these attribute-value pairs as a decision tree.　　　　　　　　**5**

(5)

Total for Section III Part B　(25)

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

SECTION III

PART C—The Internet
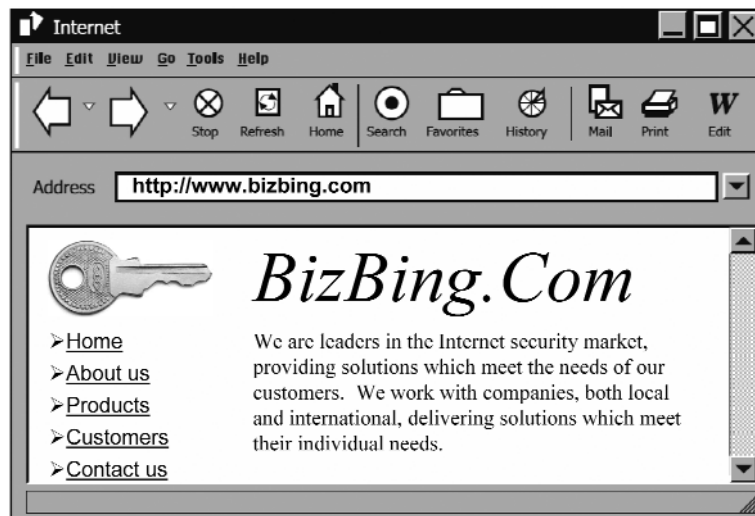
Attempt ALL questions in this section.

23. Fotto.com is a website that sells photographs.

(*a*) The Fotto.com website has a search engine that allows the user to search for photographs on any topic. Wenling is a student who uses the Fotto.com website to find pictures.

   (i) Wenling is looking for a photograph of either a yellow or red flower, which is any type except a rose. Write down the Boolean search that would produce the required result. **3**

  (ii) Wenling copies the photograph of the flower from the website without permission. State the piece of legislation Wenling may have broken. **1**

 (iii) Wenling regularly uses the Fotto.com website. State the feature of web browser software that Wenling could use to store the location of the page for easy access. **1**

(*b*) All photographs on the website use *picture compression*.

   (i) Describe **one** benefit to Fotto.com of using picture compression. **1**

  (ii) Describe **one** benefit to Wenling of the Fotto.com website using picture compression. **1**

(*c*) Fotto.com have added a new facility that allows users of the website to upload their own photographs.

   (i) State the protocol used to upload photographs to the Fotto.com website. **1**

  (ii) A user has uploaded a photograph containing their name and address.

     Explain why having their name and address on the photograph may be inappropriate. **1**

(9)

24. The home page for BizBing.com is shown below.

(a) The home page above was created using several features of web authoring software:

- the web page has been formatted into rows and columns

- the graphic animates when the pointer rolls over it

- the menu allows you to navigate to other web pages.

(i) State the feature of the web authoring software that was used to create the rows and columns. **1**

(ii) Code was added to the website that allowed the graphic to be animated when the pointer moves over it. State the feature of web authoring software that allows code to be added to the website. **1**

(b) BizBing sell Internet security software and hardware.

(i) State **two** types of Internet security software that may be sold by BizBing. **2**

(ii) BizBing's best selling hardware device is a *router*. Describe the function of a router. **2**

(c) The BizBing website makes use of both *absolute* and *relative page addressing*. The absolute page address for the BizBing logo is:

http://www.bizbing.com/image/keylogo.jpg

(i) State what *www* stands for in the above address. **1**

(ii) Some customers instead of typing http://www.bizbing.com, enter 81.99.141.142

State what 81.99.141.142 represents. **1**

(iii) Explain what is meant by the term "absolute page addressing". **1**

(iv) Explain what is meant by the term "relative page addressing". **1**

(10)

25. Betty uses the school network for class work, accessing the Internet and video conferencing.

(*a*) The school network contains a device that allows several signals to be sent down a single line at the same time. State the name of this device. **1**

(*b*) Betty uses the video conferencing facility for educational purposes.

   (i) Describe **one** example of how Betty might use video conferencing for educational purposes. **1**

   (ii) When the video conferencing data is transmitted over the Internet it is divided into *packets*. Explain why the data is divided into packets. **2**

(*c*) Betty's teacher has suggested that the class submit their homework answers using a newsgroup service. Explain why using a newsgroup may be unsuitable for submitting homework answers. **1**

(*d*) Betty has a friend who does not have access to Internet, newspaper or library services. State the term used to describe someone who does not have access to these services. **1**

(6)

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

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

[*END OF QUESTION PAPER*]