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. Describe **one** difference between *data* and *information*. **1**

2. The spreadsheet below shows the sales figures for a concert.

	A	B	C	D
1	Kinto Katz Ticket Sales			
2		Quantity	Price	Value
3	Front Seating	150	£11.00	£1,650.00
4	Rear Seating	150	£12.00	£1,800.00
5	Upper Seating	200	£10.00	£2,000.00
6	Standing	500	£7.50	£3,750.00
7			Total	£9,200.00

(*a*) State **one** *data object* used in a spreadsheet. **1**

(*b*) From the spreadsheet above, identify **one** *formatting function* that has been carried out. **1**

3. A travel agent allows customers to book holidays online.

```
Select a destination

Pick a Location        Pick a city
            ▼

France
Germany
Italy
Spain
USA
```

State the type of *validation* used to ensure that customers only choose holidays in countries offered by the travel agent. **1**

4. Slideshows and brochures are used to advertise products.

(*a*) Name the type of application software used to produce a slideshow. **1**

(*b*) Name the type of application software used to produce a brochure. **1**

5. State **two** reasons why a company may need to have a network strategy. **2**

6. State **one** advantage of using linked tables in a relational database rather than a flat file database. **1**

7. The database below shows some of the results of runners taking part in the Olympic Fun Run.

No	Start	Finish	Forename	Surname	Gender (M/F)	Athletics Club
1011	10:15:00	11:12:17	Eric	Gallimore	M	www.olympicharriers.com
1475	10:15:00	11:15:33	Daniel	McHugh	M	www.olympicrunners.co.uk
2232	10:20:00	11:41:12	Vicky	Chen	F	www.ba-athleticsclub.co.uk
2246	10:20:00	11:20:04	Jembu	Malf	M	www.runforfun.org.uk

(*a*) Suggest the most appropriate field type for the Start field. **1**

(*b*) Suggest the most appropriate field type for the Athletics Club field. **1**

8. Give **one** example of how the use of technology has changed the way people shop. **1**

9. The school information system shown below is used to print out a list of absentees.

ID Number	Forename	Surname	Class
20081237	Alison	Begley	1A
20081348	Anna	Smith	1A
20081872	Mirza	Hanif	1B
20081903	Patrick	McCann	1B
20082760	Charlie	McKenzie	1B
20081845	Naiem	Mohammed	1C
20082856	Eilidh	Fraser	1D
20081992	Johann	Schmidt	1D

(*a*) Describe how the above list has been sorted. **2**

(*b*) State **one** advantage of using an electronic information system rather than a manual system. **1**

Total for Section I (15)

[*END OF SECTION I*]

[Turn over

SECTION II

Attempt all questions in this section.

10. PawsHome is a company with cat homes across Scotland. It stores information about its cat homes and employees on paper. A sample of the data held is shown below.

Employee Name	Gender	Age	Position	Employee No	Cat Home	City
Peter Jones	Male	34	Manager	134	HOM23	Perth
Li Chan	Female	43	Secretary	145		
Mary Smith	Female	29	Manager	234	HOM45	Inverness
Amadi Adumatta	Male	52	Secretary	265		
Lisa Smith	Female	35	Cleaner	233	HOM19	Perth
Peter Jones	Male	36	Supervisor	237		

(*a*) Before the database can be implemented, the data must be normalised.

  (i) Explain why the Employee Name attribute would **not** be suitable as a primary key. **1**

  (ii) Normalise the above table by removing the multi-valued fields, and show how it would be represented in two tables. Clearly indicate meaningful table names and the primary and foreign keys. **7**

  (iii) State the one to many relationship between the above tables. **1**

(*b*) State the type of validation check that should be used to ensure that the Age attribute cannot be left empty. **1**

(*c*) PawsHome must comply with the Data Protection Act.

  (i) In terms of the Data Protection Act, state what PawsHome must do before they store personal data. **1**

  (ii) Who is the data controller in this case? **1**

(12)

11. John runs a car rental dealership. He has created a database and started entering data into it. The database is shown below.

Reg No	Make	Model	Engine Size (cc)	Daily Rental (£)
DCT04FT	Alpha	Siesta	1400	15
DCS04SJ	Alpha	Spring	1800	25
AEF54JY	Epsilon	Dash	1400	20
PFD53GF	Delta	Tiger	1400	20
EEE51EG	Sigma	Vector	1600	25
KTH50JJ	Alpha	Focus	1800	15

(*a*) A customer phones asking for a particular type of car. John used the database to output the following results.

Reg No	Make	Model	Engine Size (cc)	Daily Rental (£)
DCS04SJ	Alpha	Spring	1800	25
KTH50JJ	Alpha	Focus	1800	15

    (i) Describe how John queried the database to get the results shown above. **3**

    (ii) What name is given to the printed output from a database? **1**

(*b*) Reg No could be used as a *primary key*. What is the purpose of a "primary key"? **1**

(*c*) When creating a database, John noticed that he could add an *object* type field.

State **one** type of information that would be stored in an "object" type field. **1**

(*d*) Describe the purpose of the database user interface. **1**

(7)

[Turn over

12. Blush sells cosmetics in their High Street shops.

(*a*) Blush employs several *knowledge workers*.

Describe the job of a "knowledge worker". **1**

(*b*) Blush has a centralised database situated at its head office.

(i) What is meant by a centralised database? **1**

(ii) At the end of each day, Blush's information system is used to total that day's sales and to save the results on the hard disk.

State the **two** functions of this information system that are being carried out at the end of each day. **2**

(*c*) Angelique has just joined Blush from another cosmetics company.

(i) Angelique brought a copy of her previous employer's test results for a new lip gloss.

State **one** of the ethical implications of Blush using these test results. **1**

(ii) Before Angelique could start work, she had to sign Blush's *netiquette* agreement form.

Describe **two** rules you would expect to find on Blush's "netiquette" form. **2**

(iii) Angelique uses a computer program that contains a series of tasks that teach her how to use Blush's database software.

Name this type of program. **1**

(*d*) Ken is a website developer for Blush who has recently created Blush's cosmetic online shop.

(i) Name the type of software that would be most appropriate to build and maintain a complex website. **1**

(ii) With the introduction of the online shop, Blush found that their sales had increased significantly due to new customers.

Give one example of how Blush may have gained new customers through the online shop. **1**

(iii) Ken has found that a former employee has been hacking into Blush's computer system.

State the law that the former employee has broken. **1**

(11)

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

SECTION III

PART A—Applied Multimedia

Attempt ALL questions in this section.

13. A museum has decided to create interactive multimedia information points around the museum.

    (*a*) Below is part of the report from the analysis stage

    > *. . . the information points should allow visitors (targeted 8–14 year old children and their parents) to be able to see and hear the information about the exhibits without distracting other visitors around them. The refurbishment of the museum will be completed by November of this year and the information points must be created, tested and in place by then. The museum can afford to spend £15 000 on the development of the information points . . .*

    (i) The report on the analysis stage contains the purpose and budget available for the multimedia development. State **two** other aspects that have been considered in the above analysis report. **2**

    (ii) Recommend the most appropriate delivery medium for the museum to use in this situation. **1**

    (*b*) One of the screen designs for the presentation is shown below.

    ## EGYPTIAN PHARAOHS

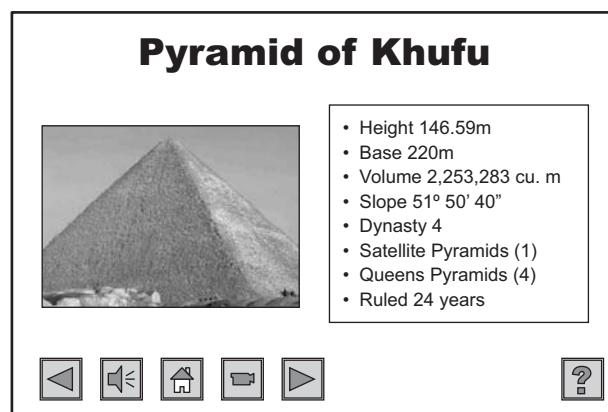   Shown below are the years that Pharaohs ruled. Years are BC.

    Sneferu ruled from 2613 to 2589, **Khufu ruled from 2589 to 2566,** Djedefra ruled from 2566 to 2558 and Khafra ruled from 2558 to 2532.

    State **two** text design principles that have been broken in the creation of the above design. **2**

13. (continued)

(*c*) One of the screens from the museum information point is shown below.

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

(ii) This type of interface was chosen because of its ease of use.

State **one** reason why the interface shown above is easy to use. **1**

(*d*) During the testing stage, a *navigation test* was carried out.

Explain the purpose of a "navigation test". **1**

(*e*) The museum evaluates the multimedia application in terms of *fitness for purpose*.

Describe **one** method the museum could use to evaluate "fitness for purpose". **1**

(*f*) The completed multimedia application plays background music.

(i) The background music was captured by sampling. Explain how the sampling rate affects the quality of the audio. **1**

(ii) Describe **one** benefit of providing background music. **1**

(*g*) During the evaluation process, many museum staff complained that the background music can be repetitive and distracts them from their jobs.

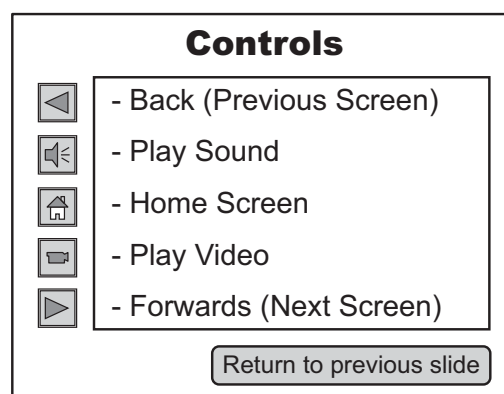(i) Describe a **software** solution to the above problem. **1**

(ii) Describe a **hardware** solution to the above problem. **1**

(*h*) If visitors to the museum are unsure how to use the multimedia application they can click on the ⸤?⸥ button and the screen shown opposite appears.
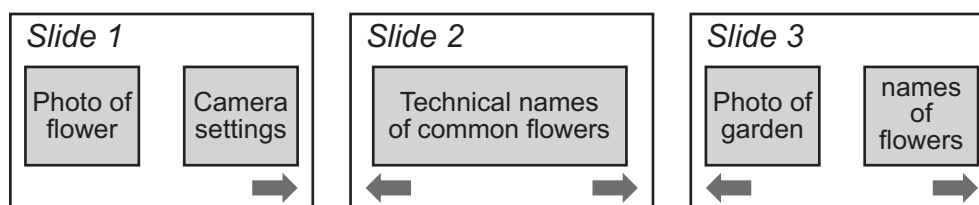
State the name given to this type of screen. **1**

(14)

Controls

◁ - Back (Previous Screen)

◁⸜ - Play Sound

⌂ - Home Screen

▭ - Play Video

▷ - Forwards (Next Screen)

[Return to previous slide]

14. MultiCorp develops multimedia applications for business.

   (*a*) State **two** examples of multimedia use for business. **2**

   (*b*) Mary is the project manager of MultiCorps's development team.

       Describe **two** tasks that will be carried out by Mary as project manager. **2**

   (*c*) The design for MultiCorps's latest application is shown below.

Slide 1	Slide 2	Slide 3
Photo of flower Camera settings	Technical names of common flowers	Photo of garden names of flowers

     (i) State the type of navigation structure that would be most appropriate in this case. **1**

     (ii) State the type of software you would recommend MultiCorp use for this project. **1**

     (iii) State the job title of the person who would provide the technical knowledge that is required for the creation of slide two. **1**

   (*d*) MultiCorp's project includes 700 colour photographs which take up 6·5 gigabytes of storage. The graphic artist has been instructed to reduce the storage requirements for the photographs from 6·5 gigabytes to 3 gigabytes.

     (i) Describe **two** methods of reducing the storage required for the photographs. **2**

     (ii) Name the storage medium that would be best suited for distributing the project to customers. **1**

     (iii) Some of the photographs have been copied from a website.

        Which law may have been broken? **1**

                                      (11)

                            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.

15. A new expert system is being developed for a travel company, to advise tourists on suitable types of holidays.

(*a*) One stage of the expert system development cycle is *knowledge representation*.

   (i) State the personnel involved at the "knowledge representation" stage. **1**

   (ii) State **one** technique used at the "knowledge representation" stage. **1**

(*b*) The diagram below shows a screen from the initial version of the expert system.

```
┌──────────────────────────────────────────────┐
│  Q:  Do you want a high activity holiday?  ┌──────┐ │
│                                            │ Why? │ │
│  User response:  yes                       └──────┘ │
│                                                     │
│  Q:  Do you want a beach location?         ┌──────┐ │
│                                            │ Why? │ │
│  User response:  yes                       └──────┘ │
│                                                     │
│  Advice:  You should choose a water sports holiday. │
│                                         ┌─────────┐ │
│                                         │ Explain │ │
│                                         └─────────┘ │
└──────────────────────────────────────────────┘
```

   (i) The *inference engine* is one component of an expert system.

      Identify one element shown above which was **generated** by the "inference engine". **1**

   (ii) State which component of the expert system is responsible for **displaying** "Q: Do you want a beach location?" **1**

   (iii) State which component of the expert system would be altered when a new type of holiday is added. **1**

   (iv) Describe the purpose of the "Explain" button on the screen. **1**

   (v) Describe the purpose of the "Why?" button on the screen. **1**

(*c*) Describe **two** economic implications for the travel company of introducing the holiday expert system. **2**

(*d*) Another expert system is being developed. This will list holiday items that should be packed. It will also provide a set of steps to follow so that tourists are organised. State the category of this expert system. **1**

(*e*) Describe how querying an expert system would differ from querying a database. **2**

(12)

16. A digital television company offers four packages to their customers, each with a different range of channels—Basic, Bronze, Silver and Gold.

The Basic package includes 15 TV channels. The Gold package allows the customer to add three more "options" to their package. The Silver package allows a choice of two out of three "options" to be added, while Bronze allows only one "option" to be added.

Shown below is **part** of the factor table showing knowledge to be entered into the expert system.

Sports Option	Movies Option	Kids Option	Package
Yes	Yes	Yes	Gold
Yes	Yes	No	Silver
Yes	No	Yes	Silver
No	Yes	Yes	Silver

(*a*) Complete the factor table using the knowledge available. **4**

(*b*) Write a rule to represent the "Gold" package from the knowledge in the table. **3**

(7)

17. Pat suffers from very painful joints, especially in his knees and elbows.

Pat learns about an online expert system that can be used at home to find out more about these problems.

(*a*) The expert system could be evaluated by its purpose and *domain* of expertise.

   (i) State the "domain" of this expert system. **1**

   (ii) State **one other** characteristic that could be used to evaluate the expert system. **1**

(*b*) Two methods of inferencing that can be used in an expert system are *forward chaining* and *backward chaining*.

   (i) Explain what is meant by "forward chaining" and "backward chaining". **2**

   (ii) Describe **one** advantage of using forward chaining in this expert system. **2**

(6)

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.

18. Ray is configuring the latest version of an e-mail client to send and receive his e-mail. The e-mail client uses POP and SMTP protocols.

    (*a*) State the purpose of POP and SMTP protocols. **2**

    (*b*) When this message is transmitted over the Internet, it is divided into *packets*.

    Explain why the message is divided into packets. **2**

    (*c*) The e-mail client inserts Ray's contact details at the end of each e-mail.

    > Ray Tomlison
    > 111 Mains Water Road
    > Glasgow
    > E-mail: R.Tomlison@parpanet.org
    > Tel: 0141 496 0001
    > Fax: 0141 496 0002

    (i) State **one** reason why Ray includes contact details in the e-mail. **1**

    (ii) Describe **one** concern Ray might have about including his contact details at the end of the e-mail. **1**

    (*d*) Ray is concerned that a virus could be downloaded as an e-mail attachment.

    Suggest **two** methods of reducing the risk of a virus infecting Ray's computer. **2**

    (8)

19. Chumms.com is a social networking website that allows friends to keep in touch when online.

    (*a*) Name the Internet service that allows friends to communicate in real-time. **1**

    (*b*) Chumms.com allows members to share photographs. Photographs are uploaded to the member's profile page.

    Name the protocol used to upload a photo. **1**

    (*c*) Many schools have blocked the Chumms website to prevent pupils from accessing it.
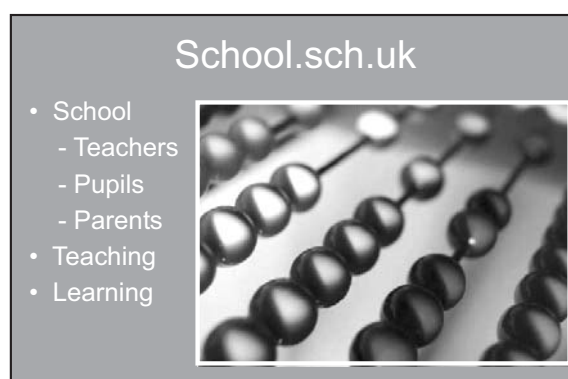
    (i) Suggest **one** reason why schools have blocked this website. **1**

    (ii) Suggest **one** reason why pupils should be allowed access to Chumms.com. **1**

    (4)

[Turn over

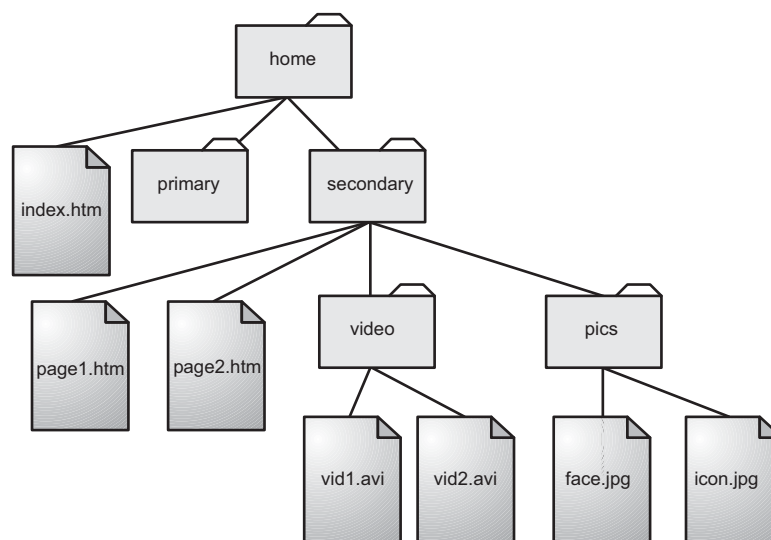**20.** The diagram below shows a school Web page.

(*a*) The layout of the Web page above has been defined using the table tool. The menu allows you to navigate from this page to other pages and the graphic animates when the pointer is moved over it.

   (i) State the feature of the Web authoring software which has been used to create the menu. **1**

   (ii) A *scripting tool* has been used to animate the graphic.

   Describe what is meant by a "scripting tool". **1**

(*b*) Here is the website file structure for www.school.sch.uk.

John is adding links to the **page1.htm** Web page.

   (i) State the absolute address John will enter on page1.htm to link to face.jpg. **2**

   (ii) State the relative address John will enter on page1.htm to link to icon.jpg. **1**

(*c*) Explain why picture compression is used on a website. **2**

(*d*) A browser is used to navigate from one page to another.

   Name the facility of a browser which allows you to store a Web address for later access. **1**

   (8)

21. Emma's favourite band is MacFlee. She is using a search engine to find the title of MacFlee's first song.

(*a*) State a Boolean search that could be entered by Emma to find this information. **3**

(*b*) Emma wishes to listen to MacFlee's first song. Describe how Emma could use the advanced features of a search engine to find the song file. **1**

(*c*) When Emma selects one of the websites suggested by the search engine, several pop-up windows appear. Name the type of software you would recommend Emma installs to prevent the pop-up windows. **1**

(5)

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

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

[*END OF QUESTION PAPER*]

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