# 2011 Information Systems

# Intermediate 2

# Finalised Marking Instructions

**SECTION 1**

**Question**                                                                 **Marks**
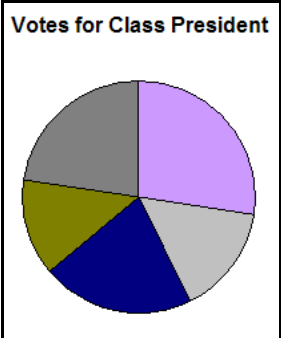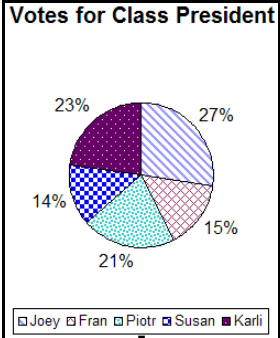
| | | | |
|---|---|---|---|
| 1 | | Explain what is meant by the term *information system*. | 1 |
| **Answer** UI 2.2 | | • *A system used by individuals or organisations to manage information* <br> • *A system that carries out processing of data* | KU |
| 2 | | The table below shows part of a train timetable. | |

| Inverness (INV) to Aberdeen (ABN) Saturdays | | |
|---|---|---|
| | Outward Journey | |
| Journey Number | 1 | 2 |
| Departure Station | INV | INV |
| Arrival Station | ABN | ABN |
| Departs | 12:42 | 14:27 |
| Arrive | 14:54 | 16:41 |
| Changes | 0 | 0 |

| | | | |
|---|---|---|---|
| | (a) | Identify **one** item of *data* from the table. | 1 |
| **Answer** UI 1.1 | | *Any example such as:* <br> • *INV* <br> • *ABN* <br> • *12:42* <br> • *Accept any single item apart from heading eg journey number* | PS |
| | (b) | Identify **one** item of *information* from the table. | 1 |
| **Answer** UI 1.1 | | *Any example such as:* <br> • *departure station – Inverness* <br> • *arrives – 16:41* <br> • *changes – 0* <br> *Any correct (label + data) = 1 mark* | PS |

| | | | |
|---|---|---|---|
| 3 | | One benefit of using an electronic database system is that *data analysis* and *reporting* can be carried out easily. | |
| | (a) | State **one** other benefit of using an electronic database system rather than a manual system. | 1 |
| **Answer** DB 1.1 | | • *Searching can be done very quickly* <br> • *Sorting can be done very quickly* <br> • *Data can be updated very quickly* <br> • *Searches and sorts are done accurately* <br> • *Takes up less space* <br> • *Easier to backup* <br> • *Automatic calculations (calculated fields)* <br> • *Can be shared on a network* | KU |
| | (b) | Explain what is meant by a database *report*. | 1 |
| **Answer** DB 5.3 | | • *Printed results (output) from a database* <br> • **Formatted** *results of a query* | KU |
| 4 | | Here is part of a database showing the tracks on a CD. <br><br> Name of CD:       The Essential Album <br> Artist:            Bryce Summersteen <br> Date of Release:   26 August 2009 <br> Tracks:           1. Thunder on the Streets <br>                    2. Born to Walk <br>                    3. The Stream <br>                    4. Jungle Territory <br>                    5. Danc | |
| | | State the relationship that exists between this CD and the tracks. | 1 |
| **Answer** DB 4.2 | | • *1 CD has many tracks* <br> • *(1:M)* | PS |

| | Question | Marks |
|---|---|---|
| 5 | Spreadsheet software can be used for keeping business accounts. State **one** other suitable type of application software for keeping business accounts. | 1 |
| **Answer** UI 3.1 | • *Financial*<br>• *Database*<br>• *(Do not accept product names eg Microsoft Access)* | KU |
| 6 | Describe what is meant by the term *data subject* with reference to the Data Protection Act. | 1 |
| **Answer** UI 4.2.1 | • *A person who has their personal data stored by an organisation* | KU |

| 7 | The following table shows details of flowers for sale. |
|---|---|

| Product Code | Image | Product Name | Price (£) | Category |
|---|---|---|---|---|
| FL24 | | Sunshine | 26.99 | Summer |
| FL10 | | Tulip Special | 37.99 | Spring |
| FL54 | | Tickled Pink | 28.99 | Celebration |
| FL55 | | Blue Heaven | 23.99 | Celebration |
| FL59 | | Red Roses | 39.99 | Celebration |
| FL25 | | Blaze of Glory | 34.99 | Summer |

| | State which Product Code would be at the top of the table when the list is sorted by Category in ascending order and by Price (£) in ascending order. | 1 |
|---|---|---|
| **Answer** DB 5.2 | • *FL55* | PS |
| 8 | Explain what is meant by a *Boolean* data type. | 1 |
| **Answer** DB 3.2 | • *An item of data that can take one of two values*<br>• *An attribute that can only store one of two values (True/False, 1/0, Yes/No)* | KU |
| 9 | The *speed*, *accuracy* and *volume* of data processed all determine the *efficiency* of an information system.<br> Explain what is meant by 'speed' in relation to an information system. | 1 |
| **Answer** UI 2.1 | • *Rate of processing items*<br>• *Rate of data entry to system* | KU |

| Question | | | Marks |
|---|---|---|---|

| | | |
|---|---|---|
| 10 | Explain why *validation* is used in a database system. | 1 |
| **Answer** <br> DB <br> 3.1 | • *To ensure that data entered into a field is sensible* <br> • *To ensure that data conforms to certain restrictions/guidelines* <br> • *To reduce errors when entering data* | KU |
| 11 | The chart below shows the share of votes cast for each candidate in a class president election. In Version 1 of the chart, it was not clear who won the election so Version 2 of the chart was created. <br><br> **Version 1**                     **Version 2** <br><br>  | |
| | Identify **one** formatting function that has been carried out to create Version 2. | 1 |
| **Answer** <br> UI <br> 3.4 | • *Change pattern of segment* <br> • *Add chart legend* <br> • *Display percentage values of each segment* <br> • *Pie chart has been scaled* | PS |
| 12 | A concert venue sells tickets from their ticket office and online from their website. <br> State **one** benefit to shoppers of buying tickets online. | 1 |
| **Answer** <br> UI <br> 4.1 | • *Buy tickets at anytime* <br> • *Can buy tickets for distant locations without need to travel there* | KU |
| 13 | Explain what is meant the by the term *foreign key*. | 1 |
| **Answer** <br> DB <br> 3.1 | • *A primary key from another table* | KU |
| | **Total for Section 1** | **(15)** |
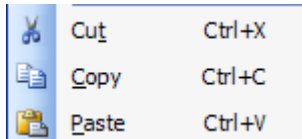
**[END OF SECTION 1]**

**SECTION 2**

| | | | Marks |
|---|---|---|---|
| **Question** | | | |

| | | | | |
|---|---|---|---|---|
| 14 | | Dox.com uses a range of software in different departments within their organisation. | | |
| | (a) | | The customer services department use a word processing application called WordExtra to write letters to customers. Before purchasing WordExtra, the application was evaluated in terms of *data objects*, *data operations*, the *HCI* and *online help*. | |
| | | (i) | State **one** data object used in a word processing document. | 1 |
| **Answer** UI 3.2 | | | • *Character* <br> • *Word* <br> • *Line* <br> • *Sentence* <br> • *Paragraph* <br> • *Page* <br> • *Image/graphic* <br> • *Table* | KU |
| | | (ii) | Describe what is meant by "online help". | 1 |
| **Answer** UI 3.4 | | | • *On screen instructions to provide assistance.* <br> *(Need both ideas of on-line and providing assistance)* | KU |
| | | (iii) | Dox.com evaluated the HCI offered by WordExtra by trying out some of the editing operations available. Part of the HCI is shown below. <br><br>  <br><br> Explain, giving **two** reasons, why Dox.com liked the HCI for editing operations. | 2 |
| **Answer** UI 3.4 | | | *Any two from* <br> • *keyboard commands available* <br> • *menu options available* <br> • *icons available* <br> • *different types of interaction available* <br> • *software is suitable for different abilities of workers* | PS |

| 14 (cont) | (b) | | Staff members send electronic messages to each other. State **one** type of software application that staff could use for this form of communication. | 1 |
|---|---|---|---|---|
| **Answer** UI 3.1 | | | • *E-mail (client)* <br> • *Chat (client)* <br> • *Browser* <br> • *Instant messaging (but not Instant messenger or MSN)* | PS |
| | (c) | | The personnel department use a spreadsheet to work out if employees are entitled to a bonus. <br><br>  <br><br> A bonus is paid to an employee if their total number of hours worked in a week is at least 40 hours. The **calculate** and **replicate** operations are used when creating the spreadsheet. | |
| | | (i) | Identify **one** cell reference from the spreadsheet above where a **calculation** has been used. | 1 |
| **Answer** UI 3.3 | | | • *H2, H3, H4, H5, H6, I2, I3, I4, I5, I6* | PS |
| | | (ii) | Identify a range of cells in the spreadsheet above where **replication** may have been used. | 1 |
| **Answer** UI 3.3 | | | • *(C1..G1) OR* <br> • *(H2..H6) OR* <br> • *(I2..I6) OR* <br> • *(F2..F6) OR* <br> • *(C2..G2) OR* <br> • *Other acceptable range of cells from the diagram* | PS |

| 14 (cont) | (d) | | In the sales department, the sales assistants use cash tills. | |
|---|---|---|---|---|
| | | (i) | The sales assistant types the product code into the cash till when a customer buys an item. Describe **one** other method that could be introduced to input data about an item sold. | 1 |
| **Answer** UI 2.2 | | | • *By scanning the bar code (Not just barcode on its own)* • *Accept other possible methods* | PS |
| | | (ii) | When the product code for a sale is entered, the item name and price is displayed on the screen. Describe **one** other method of output that may be used in this system. | 1 |
| **Answer** UI 2.2 | | | • *Printed receipt* • *Output to file* | PS |
| | (e) | | Describe **one** area of health and safety regulations, relating to using computers at work, that Dox.com should consider. | 1 |
| **Answer** UI 4.2.4 | | | • *Seating should be height and back adjustable* • *Lighting should be reflected to reduce glare* • *Precautions should be taken to prevent Repetitive Strain Injury (RSI)* • *Regular eye tests and breaks from using the computer should be given to reduce the possibility of eye strain* • *Lead aprons should be provided to employees concerned about radiation* | KU |

| Question | | | | Marks |
|---|---|---|---|---|
| 15 | | A DIY warehouse stores details about its suppliers and products. Some of the data held is shown below. | | |

| | Supplier ID | C34792 | | |
| | Supplier Name | Chark | | |
| | Address | 15 Mains Industrial Park | | |
| | Town | Downhall | | |
| | Telephone | 01234567899 | | |

| ProductID | Description | Price (£) | Department |
|---|---|---|---|
| AB123 | Paving Brush | 4.98 | Garden Tools |
| AB479 | Dustpan set | 5.50 | Cleaning |
| AB604 | Long handled broom | 6.75 | Cleaning |
| PT198 | Wire cup brush | 7.69 | Power Tools |
| DC902 | Wallpaper brush | 1.55 | Decorating |

| Question | | | | Marks |
|---|---|---|---|---|
| | (a) | The DIY warehouse has been advised to remove the multi-valued fields by *normalisation*. State **two** reasons for normalising data. | | 2 |
| **Answer** DB 4.1 | | *Any two from* <br> • *Identify which attributes belong in each table* <br> • *Identify the tables that are required* <br> • *Identify the relationships between the tables* <br> • *Remove data duplication* <br> • *Remove data inconsistency* <br> • *Remove anomalies* <br> • *Remove insertion anomaly* <br> • *Remove deletion anomaly* <br> • *Remove modification anomaly* <br> • *Remove multi-valued fields* <br> • *Identify primary **and** foreign keys* | | KU |
| | (b) | Identify and remove the multi-valued fields from the above table and represent the data as two entities with suitable names. Identify all primary and foreign keys. | | 7 |
| **Answer** DB 4.3 | | *SUPPLIER(supplierID , supplier name, address, town, telephone number)* <br> *PRODUCT(productID, description, price, department, supplierID\*)* <br><br> *1 mark for SUPPLIER table name* <br> *1 mark for all correct attributes in SUPPLIER* <br> *1 mark for supplier_id as PK* <br><br> *1 mark for PRODUCT table name* <br> *1 mark for all correct attributes in PRODUCT* <br> *1 mark for product_id as PK* <br> *1 mark for supplier_id as FK* | | PS |
| | (c) | When setting up the new database, the field called Price (£) is created using a *real* data type. Explain what is meant by a 'real' data type. | | 1 |
| **Answer** DB 2.1 | | • *Item of data that is a number which has a decimal/fractional part* | | KU |

| Question | | | | Marks |
|---|---|---|---|---|
| 16 | | Mirkot is a mail order company that sells goods to customers.  In 2009, Mirkot set up a computerised information system to handle orders. | | |
| | (a) | Describe **two** costs involved in setting up a computerised information system. | | 2 |
| **Answer** UI 4.3 | | *Any two from* <br> • *Initial costs – hardware, software, installation of system (networking/hardware, etc)* <br> • *Training staff to use new system* <br> • *Employing new **specialist** staff* | | KU |
| | (b) | Mirkot establish a *backup strategy* to avoid losing information in the system. | | |
| | | State **one** reason why Mirkot need to avoid losing information. | | 1 |
| **Answer** UI 2.3 | | • *Mirkot cannot continue to run without data to work with – cannot access files for customers/products/suppliers/etc* <br> • *Customer loss of confidence in Mirkot if they cannot function so take business to another company* | | PS |
| | (c) | After one year of using the information system, the chart below is created. <br><br>  <br><br> Describe **two** economic benefits to Mirkot of introducing their computerised information system. | | 2 |
| **Answer** UI 4.3 | | *Any 2 from* <br> • *Increased productivity (increased number of orders)* <br> • *Increased profitability (increased revenue/income)* | | PS |

| 17 | A library uses a *flat file* database to store details about members and the books they borrow. Here is part of the file. | |
|---|---|---|

| Membership Card ID | Member Name | Telephone | Book Reference | Book Title | Date Borrowed |
|---|---|---|---|---|---|
| KP102 | Mary Smith | 987265 | BK234 | Emma | 12/3/09 |
| KP982 | James Main | 967364 | BK287 | The Green Mile | 12/3/09 |
| KP102 | Mary Smith | 978265 | BK290 | Pride and Prejudice | 02/4/09 |
| KP982 | Jimmy Main | 967364 | BK205 | Blaze | 14/4/09 |
| KP982 | James Main | 967364 | BK106 | The Dark Tower | 21/4/09 |
| KP345 | Jo Jones | 911235 | BK287 | The Green Mile | 15/5/09 |

A flat file database has a number of limitations. The same data is often entered several times. This duplication of data can lead to inconsistencies such as data being entered differently or incorrectly.

| | (a) | Explain what is meant by the term "flat file database". | 1 |
|---|---|---|---|
| **Answer** DB 3.3 | | • *All data held in one table* | KU |

| | (b) | From the table above, give **one** example where data is duplicated. | 1 |
|---|---|---|---|
| **Answer** DB 3.3 | | • *BK287*<br>• *The Green Mile*<br>• *KP102*<br>• *Mary Smith*<br>• *KP982*<br>• *967364* | PS |

| | (c) | James Main cannot remember which books he has borrowed from the library. The librarian enters the query "James Main" into the Member Name field. | |
|---|---|---|---|
| | | (i) | Explain what is meant by a "query". | 1 |
| **Answer** DB 5.2 | | | • *Processes (searching and/or sorting) carried out to extract information from a file* | KU |
| | | (ii) | Explain why this query for James Main will not show all the information about books he has borrowed using his membership card. | 1 |
| **Answer** DB 3.3 | | | • *Jimmy Main and James Main are the same person*<br>• *Only finds James Main's loans, not Jimmy Main's yet they have the same membership card ID* | PS |
| | | (iii) | State a query that would find all the books borrowed by James Main. | 1 |
| **Answer** DB 3.3 | | | • *Query Membership Card ID field for KP982.*<br>• *Query Member name = James Main OR Member name = Jimmy Main* | PS |

| | | | **Total marks for Section 2** | **(30)** |
|---|---|---|---|---|

**[END OF SECTION 2 − PART A]**

**SECTION 3**

**Part A – Applied Multimedia**

| Question | | | | | Marks |
|---|---|---|---|---|---|
| 18 | | | Emily owns a jewellery shop. | | |
| | (a) | | Emily employs a company to produce a catalogue of her jewellery on CD-ROM. This catalogue will be posted out to her customers. | | |
| | | (i) | During the analysis stage the user must be considered. Describe **two** factors about the user that must be considered. | | 2 |
| **Answer** AM 2.1 | | | *Any 2 from* <br> • *Age group* <br> • *Computer expertise* <br> • *Accessibility* <br> • *Geographical location (Language Spoken)* | | PS |
| | | (ii) | Apart from the user, state **two** other aspects of the analysis that should be considered. | | 2 |
| **Answer** AM 2.1 | | | *Any 2 from* <br> • *Purpose of the CD* <br> • *Content of the CD* <br> • *Budget* <br> • *Timescale for completion* | | KU |
| | (b) | | Michael works for the company that Emily has employed to create her CD-ROM. | | |
| | | (i) | Michael sketches screens to be included in the CD-ROM. State Michael's job title. | | 1 |
| **Answer** AM 5.3 | | | • *Multimedia designer* | | PS |

| Question | | | | | Marks |
|---|---|---|---|---|---|
| 18 (cont) | (b) | (ii) | | Shown below are the first sketches made by Michael. | |
| | | | |  | |
| | | | (A) | Draw the navigation map structure for the sketches shown above. | 2 |
| **Answer** AM 3.1 | | | |   *1 mark for level 1*  *1 mark for level 2*  *1 mark only if names are not in boxes*  *Ignore arrows, lines on their own are acceptable*  *Other correct diagrams are acceptable.* | PS |
| | | | (B) | State the type of navigation structure to be used in the CD-ROM. | 1 |
| **Answer** AM 3.1 | | | | • *Hierarchical* | PS |

| 18 (cont) | (c) | | Michael has been asked to prepare storyboards for a new section on Earrings.  He creates the storyboard shown below. | |
|---|---|---|---|---|
| | | |  | |
| | | (i) | Describe **two** design principles relating to text demonstrated in the sketches above. | 2 |
| **Answer** AM 4.2 | | | *Any two from* <br> • *Consistency in headings/body text* <br> • *Use of lists/bullet points for main points* | PS |
| | | (ii) | Describe **one** design principle relating to graphics demonstrated in the sketches above. | 1 |
| **Answer** AM 4.3 | | | • *Use of text wrap* <br> • *Use of caption on graphic* <br> • *Consistent alignment/positioning of graphics* | PS |

| | | | | |
|---|---|---|---|---|
| 18 (cont) | (d) | | Some of the screens involve synchronising many complex multimedia objects. State the most appropriate type of software for creating the CD catalogue. | 1 |
| **Answer** AM 5.1 | | | • *Authoring* <br> • *Scripting* <br> • *Icon based* | PS |
| | (e) | | Due to the large number of high quality graphics, the catalogue requires 3·4Gb of storage. The graphics specialist has been given the job of reducing the file size. | |
| | | (i) | Without altering the physical dimensions of the graphics, describe **two** methods of reducing each graphic's file size. | 2 |
| **Answer** AM 6.1 | | | *Any 2 from* <br> • *Reduce the colour depth* <br> • *Reduce the resolution* <br> • *Compress the graphic* | PS |
| | | (ii) | After reducing the file size of the graphics, the catalogue still requires 1·2Gb of storage and will not fit onto a CD-ROM. State the most appropriate delivery medium for posting the catalogue to customers. | 1 |
| **Answer** AM 1.2 | | | • *DVD-ROM* | PS |
| | | | **Total marks** | **(15)** |

| | | | | Marks |
|---|---|---|---|---|
| 19 | | | GoldRiver is a shopping and leisure complex.  GoldRiver plans to provide electronic public information points.  These points will provide information about shop locations, catering facilities and cinema listings. | |
| | (a) | (i) | State the most appropriate delivery medium for the public information points. | 1 |
| **Answer** AM 1.2 | | | • *Kiosk* | PS |
| | | (ii) | State **two** reasons for your answer to part (i) | 2 |
| **Answer** AM 1.3 | | | *Any 2 from* <br> • *Has a large capacity to hold lots of information* <br> • *Has a fast data transfer rate* <br> • *Touch screen is user friendly* <br> • *Robust* <br> • *Easy to update* | KU |
| | (b) | | Before the information points can be used, testing must be carried out. | |
| | | (i) | Explain the purpose of *screen testing*. | 1 |
| **Answer** AM 7.2 | | | • *Make sure the text is spell checked* <br> • *Ensure layout is correct (matches design)* <br> • *Ensure graphics are not pixelated* <br> • *Make sure the audio clips run well* <br><br> *Any other suitable answer* | KU |
| | | (ii) | Explain the purpose of *navigation testing*. | 1 |
| **Answer** AM 7.2 | | | • *Ensures hyperlinks work correctly* <br> • *Ensures there are smooth transitions between screens* | KU |
| | (c) | | The information points make use of audio. | |
| | | (i) | State **two** possible uses of audio in GoldRiver's information points. | 2 |
| **Answer** AM 4.4 | | | *Any 2 from:* <br> • *Voice output for menu choices/narration* <br> • *Playing background music* <br> • *Playing sound clips from films shown in the cinema* | PS |
| | | (ii) | Describe how the sampling rate affects the quality of the audio. | 1 |
| **Answer** AM 4.4 | | | *The higher the sampling rate the better the sound quality* | KU |

| 19 (cont) | (d) | | The information points make use of logos from different shops on some of their screens. | |
|---|---|---|---|---|
| | | (i) | The manager of GoldRiver is concerned about including company logos on their screens. Explain why she is concerned. | 1 |
| **Answer** UI 4.2 | | | • *Logos may be copyright (idea of copyright is essential)* | PS |
| | | (ii) | Describe what GoldRiver could do to ease the manager's concerns, while still including the company logos on their screens. | 1 |
| **Answer** | | | *Get permission from the copyright holder to use the logos* | PS |
| | | | **Total marks** | **(10)** |
| | | | **Total for Section 3 Part A** | **(25)** |

**[END OF SECTION 3 − PART A]**

**SECTION 3**

**Part B – Expert Systems**

**Question**                                                                                               **Marks**

| | | | | |
|---|---|---|---|---|
| 20 | | 'My Little Helper' is an expert system that suggests which toys are suitable for different children. | | |
| | (a) | | Azim provided the knowledge for the expert system. State Azim's role in the development of the 'My Little Helper' expert system. | 1 |
| **Answer ES 3.1** | | | • *Domain Expert* | PS |
| | (b) | | Four screens from the expert system are shown below. | |
| | | | My Little Helper<br><br>Who is the gift for?<br>   o   Boy<br>   o   Girl<br>                    Explain<br><br>My Little Helper<br><br>What age is the child?<br>   o   0 – 6 months<br>   o   6m – 1 year<br>   o   1 year +      Explain<br><br>My Little Helper<br><br>What is the child interested in?<br>   o   Cars<br>   o   Dolls<br>   o   Books      Explain<br>   o   Games<br><br>My Little Helper<br><br>Suggested Toys:<br>   o   Timmy Truck<br>   o   Callum Carr<br>   o   Connect 7<br>                    Reason | | |
| | | (i) | Identify the component of the expert system shown above. | 1 |
| **Answer ES 1.5** | | | • *User interface* | PS |
| | | (ii) | Describe the main function of the component you named in part (i). | 1 |
| **Answer ES 1.5** | | | • *To ask questions and get answers from the user*<br>• *To display advice*<br>• *To display the justification for asking particular questions*<br>• *To display the justification of the conclusion reached by the expert system* | KU |

| Question | | | | Marks |
|---|---|---|---|---|
| | | (iii) | From the screens above, identify the part used for *why* justification. | 1 |
| **Answer ES 3.5** | | | • *Explain button* | PS |
| | | (iv) | During the development, the following information was used. | |

| No | Input | Expected Output | Actual Output |
|---|---|---|---|
| 1 | Boy<br>Age - 3 months<br>Interest - Cars | • Timmy Truck<br>• Bath time buddies<br>• Trucks 'n Cars | • Timmy Truck<br>• Bath time buddies<br>• Trucks 'n Cars |
| 2 | Girl<br>Age - 1 year +<br>Interest - Books | • Gerry the Giraffe by P Glancy<br>• Everyone loves a nut by A Tree | • Connect 7<br>• Hungry Elephants |

| Question | | | | Marks |
|---|---|---|---|---|
| | | | Identify the stage in the development process where this information would be used. | 1 |
| **Answer ES 3.4** | | | • *Testing*<br>• *System Validation* | PS |
| | | (v) | State **two** criteria used to evaluate an expert system. | 2 |
| **Answer ES 3.1** | | | *Any 2 from*<br>• *The purpose (ie type of ES and domain)*<br>• *Range or coverage of rules*<br>• *Quality of the user interface*<br>• *Structure of questions*<br>• *Presentation of conclusion*<br>• *Quality of explanations*<br>• *Good description of Turing test* | KU |
| | | | **Total marks** | **(7)** |

| Question | | | | Marks |
|---|---|---|---|---|
| 21 | | Darius is an expert on diamonds.  Darius grades diamonds as follows: <br><br> • If the diamond is round, clear in colour with a rough texture and no imperfections then it is graded as grade 1. <br><br> • Square diamonds that have a smooth texture and have a few imperfections are graded as grade 2 as long as they are clear. <br><br> The first paragraph can be represented using the following attribute-value pair <br> Grade1(shape=round, colour=clear, texture=rough, imperfections=no) | | |
| | (a) | Create an attribute-value pair for grade 2 diamonds. | | 2 |
| **Answer** ES 4.2 | | • *Grade2(shape=square, colour=clear, texture=smooth, imperfections=yes)* <br><br> *All correct 2 marks, 1 mistake = 1 mark,  >1 mistake = 0 marks* | | PS |
| | (b) | Darius has been asked to work with the *knowledge engineer* to develop the expert system. <br> Explain the role of the "knowledge engineer." | | 2 |
| **Answer** ES 3.1 | | *Any 2 from* <br> • *Obtaining the domain knowledge from the expert (Darius)* <br> • *Representing this information using a suitable Knowledge Representation Language (KRL)* <br> • *Testing the system operated correctly* | | KU |
| | (c) | Darius is considering using this expert system to grade his diamonds. <br> State the category of this expert system. | | 1 |
| **Answer** ES 1.6 | | • *Classification* | | PS |
| | | | **Total marks** | **(5)** |

| Question | | | | Marks |
|---|---|---|---|---|
| 22 | | PC Planet is a large computer shop. It uses an expert system to select the most appropriate computer for a customer. | | |
| | (a) | | The first stage in developing PC Planet's expert system was *knowledge acquisition*. Describe what is involved in "knowledge acquisition". | 1 |
| **Answer** ES 3.2 | | | • *Gathering the knowledge required for the expert system* | KU |
| | (b) | | State the second stage in developing the expert system. | 1 |
| **Answer** | | | • *Knowledge representation* | KU |
| | (c) | | The following advert was shown in a computer magazine. | |

**PC Planet's Amazing Prices!!!**

**Basic PC**
Memory - 4Gb
Hard Drive - 500 Gb

**Ultimate PC!!!**
Memory - 8Gb
Hard Drive - 1000Gb
Internet Ready - YES!!!

In the expert system, the rule for the Basic PC is:

Computer     IS     basic          IF
Memory       IS     4Gb            AND
Hard Drive   IS     500Gb.

| | | (i) | Identify the method of inferencing that has been used in the above rule. | 1 |
|---|---|---|---|---|
| **Answer** ES 2.4 | | | • *Backward Chaining* | PS |
| | | (ii) | Explain your answer to part (i). | 1 |
| **Answer** ES 2.4 | | | • *Starts with hypothesis and looks for supporting evidence* | PS |

| 22 (cont) | | (iii) | Create a rule for the Ultimate PC as described in the advert above. | 3 |
|---|---|---|---|---|
| **Answer** | | | *Computer        IS      Ultimate        IF*<br>*Memory          IS      8Gb             AND*<br>*Hard Drive      IS      1000Gb          AND*<br>*Internet Ready IS      Yes.*<br><br>*4 lines correct – 3 marks*<br>*3 lines correct – 2 marks*<br>*2 lines correct – 1 mark*<br>*<2 lines correct – 0 marks* | PS |
| | | | **Total marks** | **(7)** |

| Question | | | | Marks |
|---|---|---|---|---|
| 23 | | "HotHair" is an expert system used by hairdressers.  The information from the expert system is shown in the following decision tree. | | |



| | | | | |
|---|---|---|---|---|
| | (a) | One reason for using the HotHair expert system is to advise clients on which shampoo to buy.<br>Describe **two** other reasons for using HotHair. | | 2 |
| **Answer**<br>ES<br>1.1 | | • *To represent the knowledge of many hairdressers*<br>• *To provide explanations as to choice of shampoo*<br><br>*Answers must relate to the scenario* | | PS |
| | (b) | Zach has highlights in his hair and needs to wash it every day but hates to use conditioner.<br>Identify the shampoo the HotHair expert system would recommend for Zach. | | 1 |
| **Answer**<br>ES<br>3.3 | | • *Heads 'n' Toes* | | PS |
| | (c) | The HotHair expert system is going to be published on the Internet.  The company are concerned about their *Information Intellectual Property Rights.*<br>Explain what is meant by 'Information Intellectual Property Rights'. | | 1 |
| **Answer**<br>UI<br>4.4 | | • *Original knowledge which can be assigned legal protection*<br>• *Legal property rights over creations of the mind, both artistic and commercial* | | KU |

| 23 (cont) | (d) | An alternative way to store this information is in the form of a database. | | |
|---|---|---|---|---|
| | | (i) | How many records would the database have? | 1 |
| **Answer** | | | • *8* | PS |
| | | (ii) | How many fields would the database have? | 1 |
| **Answer** | | | • *4* | PS |
| | | | **Total marks** | **(6)** |
| | | | **Total for Section 3 Part B** | **(25)** |

**[END OF SECTION 3 − PART B]**
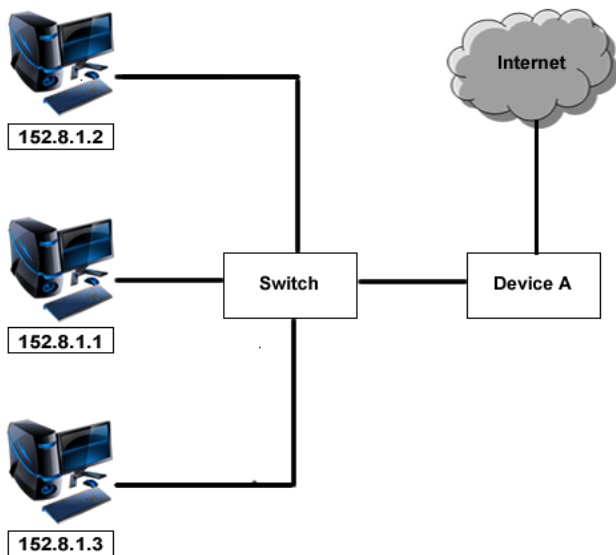
**SECTION 3**

**Part C – The Internet**
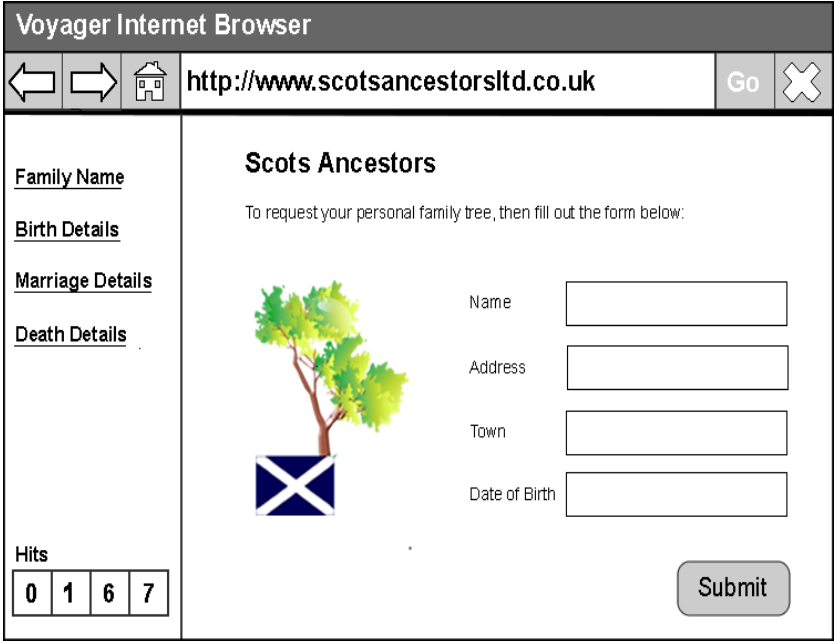
| Question | | | | | Marks |
|---|---|---|---|---|---|
| 24 | Multivalley is a new energy drinks company. The layout of their network is shown below.  | | | | |
| | (a) | Describe the function of a *switch*. | | | 1 |
| **Answer** INT 1.1.7 | | • *To direct messages to a particular computer* | | | KU |
| | (b) | Device A is used to connect the network to the Internet. State the name of device A. | | | 1 |
| **Answer** INT 1.1.7 | | • *Router* | | | PS |
| | (c) | Identify an *IP Address* from the diagram above. | | | 1 |
| **Answer** INT 1.1.4 | | • *152.8.1.1* <br> • *152.8.1.2* <br> • *152.8.1.3* | | | PS |
| | (d) | The *TCP/IP* protocols are used to transmit data across a network. | | | |
| | | (i) | Describe the function of the TCP protocol. | | 1 |
| **Answer** INT 1.1.3 | | | • *TCP divides/combines the message into packets* | | KU |
| | | (ii) | Describe the function of the IP protocol. | | 1 |
| **Answer** INT 1.1.3 | | | • *IP provides the (source and destination) addresses* <br> • *IP routes packets around the network* | | KU |

| Question | | | | Marks |
|---|---|---|---|---|
| 24 (cont) | (e) | The directors of Multivalley are concerned about a damaging program that an employee has downloaded. This program is deleting files from the hard drives.<br>Describe how Multivalley could have protected itself from this program. | | 2 |
| **Answer** INT 2.6 | | *Any 2 from*<br>• *Install virus protection software (1 mark)*<br>• *Update virus protection software regularly (1 mark)*<br>• *Install filtering software (1 mark)*<br>• *Exclude certain file types eg .exe (1 mark)*<br>• *Install firewall (1 mark)* | | PS |
| | | | **Total marks** | **(7)** |

| Question | | | | Marks |
|---|---|---|---|---|
| 25 | | Scots Ancestors Ltd is an Internet company that helps customers trace their ancestors. The company used web authoring software to create their website making use of *icon based* features and *web tools*. | | |
| | (a) | | State **one** reason why "icon based" features are easy to use. | 1 |
| **Answer** INT 4.1.1 | | | • *Picture gives an indication of the tools function* • *No need to learn commands* | KU |
| | (b) | | The contacts page of their website is displayed using the Voyager Internet Browser. | |

**Voyager Internet Browser**

http://www.scotsancestorsltd.co.uk   Go

**Scots Ancestors**

To request your personal family tree, then fill out the form below:

Family Name

Birth Details

Marriage Details

Death Details

Name

Address

Town

Date of Birth

Hits

| 0 | 1 | 6 | 7 |

Submit

| | | (i) | Identify **one** navigation feature present in the Voyager Internet Browser. | 1 |
|---|---|---|---|---|
| **Answer** INT 2.3 | | | • *Back Button* • *Forward Button* • *Home Button* • *Address Bar* | PS |
| | | (ii) | Explain the purpose of the navigation feature that you identified in part (i). | 1 |
| **Answer** INT 2.3 | | | • *Back Button – goes to the last page visited* • *Forward Button – retrace steps to pages visited since you last pressed back button* • *Home Button – returns to the page marked as your home page* • *Address Bar – goes to an exact web address* *Explanation must refer to the feature chosen in part (i)* | KU |

| | | | | Marks |
|---|---|---|---|---|
| 25 (cont) | | (iii) | The *hyperlink tool* was used in creating the Scots Ancestors Ltd contacts page. Identify a hyperlink in the above web page. | 1 |
| **Answer** INT 4.1 | | | *Any 1 from* <br> • *Family Name* <br> • *Birth Details* <br> • *Marriage Details* <br> • *Death Details* | PS |
| | | (iv) | Identify **two** features of the above web page that were created using specialist *web tools*. | 2 |
| **Answer** INT 4.1 | | | *Any two from* <br> • *The submit button* <br> • *The hit counter* <br> • *The navigation bar* <br> • *The form fill-in fields* | PS |
| | (c) | | The website contains high quality graphics. *Picture compression* has been used on the graphics. | |
| | | (i) | Explain why "picture compression" is required. | 2 |
| **Answer** INT 4.3.2 | | | *Any two from* <br> • *To reduce the file size of the image* <br> • *So that it downloads quickly* | PS |
| | | (ii) | State a development in communications technology that has made picture compression less necessary. | 1 |
| **Answer** INT 3.1.1 | | | • *Broadband* <br> • *ADSL* <br> • *Cable* <br> • *Fibre Optic - allows transmission at higher bandwidths* <br> • *Faster Router* <br> • *Faster download speeds* | PS |
| | (d) | | The website design is subject to *Information Intellectual Property Rights*. | |
| | | | Explain what is meant by "Information Intellectual Property Rights". | 1 |
| **Answer** UI 4.4.2 | | | *Any 1 from* <br> • *Original knowledge which can be assigned legal protection* <br> • *Legal property rights over creations of the mind, both artistic and commercial* | KU |
| | | | **Total marks** | **(10)** |

| | | | | | |
|---|---|---|---|---|---|
| 26 | | Help for Africa is a charity which provides technology for use in African countries. | | | |
| | (a) | | The charity's slogan is "Helping those who are information poor". Explain why many parts of Africa are classed as *information poor*. | | 1 |
| **Answer** INT 1.4 | | | • *They do not have access to information such as newspapers, books and the www* | | PS |
| | (b) | | The charity is working on their latest project sending mobile phones to farmers.  They create a list of farming communities in Africa that are not in mountainous regions. State a Boolean search that could be used to create this list. | | 3 |
| **Answer** INT 2.4 | | | • *Africa (1 mark)* <br> • *AND farming communities (1 mark)* <br> • *NOT mountainous regions (1 mark)* <br><br> *(+ can be used instead of AND, - can be used instead of NOT)* | | PS |
| | (c) | | The charity publishes the following article on their website: <br><br> *"The original principle of the Internet was to allow individuals from all over the world to freely exchange information. However, we have become concerned that some governments are discussing the possibility of blocking access to certain websites.  Furthermore, there is now proof that some police forces are using spyware to monitor the Internet activity of people in their country."* | | |
| | | (i) | From the above article, identify an example of *censorship*. | | 1 |
| **Answer** | | | • *Blocking access to certain websites* | | PS |
| | | (ii) | From the above article, give an example of an issue that affects *privacy*. | | 1 |
| **Answer** | | | • *Using spyware to monitor the Internet activity of people in their country* | | PS |
| | (d) | | The charity communicates with their workers in Africa using e-mail.  E-mail uses the SMTP and POP protocols. | | |
| | | (i) | State the purpose of the SMTP protocol. | | 1 |
| **Answer** INT 1.3.3 | | | • *Sending e-mail* | | KU |

| 26 (cont) | | (ii) | State the purpose of the POP protocol. | 1 |
|---|---|---|---|---|
| **Answer** INT 1.3.3 | | | • *Receiving e-mail* | KU |
| | | | **Total marks** | **(8)** |
| | | | **Total for Section 3 Part C** | **(25)** |

**[END OF SECTION 3 − PART C]**

[END OF MARKING INSTRUCTIONS]