X206/11/01

COMPUTING 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 – Artificial Intelligence

       Part B – Computer Networking

       Part C – Multimedia Technology

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. Convert the decimal number 27 into an 8 bit binary number. **2**

2. Define a *computer virus*. **2**

3. Name **two** parts of a processor. **2**

4. State an appropriate storage medium for storing a two hour movie. **1**

5. State **one** economic factor that has led to the development of the Internet. **1**

6. State **one** difference between machine code and a high level language. **1**

7. A user consults a technical guide to help him install software.

   State **one** other feature that should be included in the technical guide. **1**

8. State the benefit of using internal commentary within a computer program. **1**

9. Describe **one** method of creating a macro. **1**

10. State **one** logical operator that could be used when creating code. **1**

11. A program has been created to check dates. A user enters the number for the **day of the month**. Test data for January is shown below:
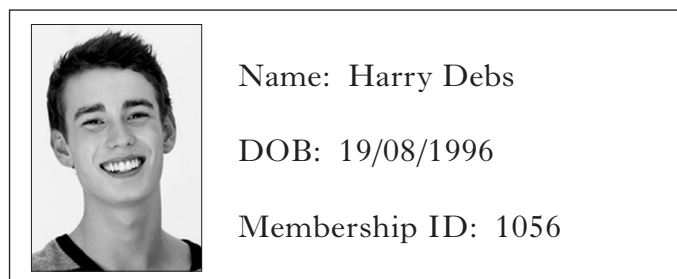
Normal	2	15
Extreme	1	31

   State **two** possible values for exceptional data. **1**

12. Name the standard algorithm required to check that the correct length of password has been entered. **1**

[*END OF SECTION I*]

SECTION II

Attempt ALL questions in this section.

13. A local sport centre issues membership cards.

Name: Harry Debs

DOB: 19/08/1996

Membership ID: 1056

(*a*) State **one** reason why a *digital camera* rather than a *webcam* is used to capture a member's photograph. **1**

(*b*) State the most appropriate type of application package for storing details about 1,500 members. **1**

(*c*) The sports centre must comply with the *Data Protection Act*.

State **two** ways in which the sports centre staff could breach the Data Protection Act. **2**

(*d*) Each membership card requires 1·6 Megabytes of storage.

Calculate the storage requirements for 1,500 membership cards in Gigabytes.

Show all working. **2**

(*e*) The centre's gym has a variety of exercise bikes. Each bike is programmed to calculate the average speed reached over a minute.

 (i) State the *standard algorithm* used to find the highest average speed for the cyclist. **1**

 (ii) The program has been updated to monitor the cyclist's heart rate.

 Name the stage of the software development process that has been carried out. **1**

 (iii) A new customer has problems when controlling the program options.

 Name the documentation that this customer should refer to. **1**

 (iv) The documentation can be downloaded from the Internet as a standard file format.

 Explain why standard file formats are used in this situation. **1**

(10)

14. A supermarket chain, Tesda, allows customers to use self service tills.

(*a*) The customer uses a device to capture an item's barcode.

Name this device. **1**

(*b*) As the customer adds items to a bag, a program calculates the total weight of the bag. If this bag weighs more than 5 kg a beeping sound is made.

(i) State the device that produces this sound. **1**

(ii) Part of the algorithm used to generate the beeping sound is shown below:

2.1	repeat
2.2	add item weight to total weight
2.3	if total weight >5 then
2.4	start beeping noise
2.5	endif
2.6	until no more items

Name the type of loop used in the algorithm above. **1**

14. (continued)

(*c*) The store manager wants a program to calculate when a 2 for 1 promotion should be made available to shoppers. A promotion is offered when the following conditions are met:

- **300 items or more are left in stock**
- **remaining days are less than 10 days**

Part of the algorithm is shown below:

3.1	let remaining days = sell by date – todays date
3.2	if _____ then
3.3	start 2 for 1 promotion
3.4	endif

(i) Complete step 3.2 of the algorithm. **2**

(ii) Pseudocode is the design notation used above.

State **one** *graphical design notation* that could have been used. **1**

(*d*) The supermarket tills are connected to a powerful computer system which processes all the supermarket's data.

(i) Name the type of computer system used. **1**

(ii) State the most appropriate backing storage device that could be used to access this data quickly. **1**

(*e*) State **two** benefits to Tesda of networking their computer systems across the country. **2**

(10)

[Turn over

15. A truck haulage company is planning a program to calculate and display journey times. A sketch of the user interface is shown below:

(*a*) Name the stage of the software development process when this sketch would be created. **1**

(*b*) The calculation for the journey time is:

Distance *divided* by Speed *add* Break Times

  (i) Using a high level language with which you are familiar, write a line of code for this calculation. **2**

  (ii) State a suitable *variable type* for the journey time. **1**

(*c*) The programmers decide to use *pre-defined* functions in the code.

Describe **one** benefit of using pre-defined functions. **1**

(*d*) The program code is entered using a *text editor*.

Name **one** feature of a text editor. **1**

(*e*) Explain why the completed program needs to be translated. **1**

(*f*) The haulage company uses *e-mail* to distribute the program to their managers for testing.

Describe **two** disadvantages of using e-mail to distribute this program. **2**

(*g*) The completed software is evaluated to check its *fitness for purpose*.

State what is meant by the term fitness for purpose. **1**

(10)

[*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—Artificial Intelligence

Attempt ALL questions in this section.

16. The annual AiFutures Conference showcases developments in game playing programs since the 1950's.

   (*a*) Early computer games that followed a set of simple rules were used to demonstrate artificial intelligence.

   (i) State **one** reason why early game playing programs were used to demonstrate artificial intelligence. **1**

   (ii) Name **one** early computer game program that demonstrated artificial intelligence. **1**

   (*b*) State **one** development in hardware, other than processing speed, that has made progress in the field of game playing possible. **1**

   (*c*) Name and describe the test that is used to determine whether a computer shows intelligence. **2**

   (5)

17. MagicMow is an intelligent robot that cuts grass. It responds to spoken commands such as START, CUT and STOP.

(*a*) State **one** advantage of using an intelligent robot for cutting grass rather than a robot with no intelligence.　**1**

(*b*)　(i) State the area of artificial intelligence that is being used by the robot to understand spoken commands.　**1**

　(ii) Suggest **two** factors that might make communication with the robot difficult.　**2**

(*c*) The robot navigates around flowerbeds and stops cutting when it reaches the edge of the grass.

State the area of artificial intelligence that allows the robot to detect the edge of the grass.　**1**

(5)

[Turn over

18. MovieMania software can be used with the latest palmtop computer systems.   *Marks*

(*a*) Handwriting recognition is used for booking movie tickets.

  (i) Name an input device that is built into a palmtop computer system that allows handwriting recognition.   **1**

  (ii) Describe what the user must do before using handwriting recognition for the first time.   **1**

(*b*) Users answer questions about the types of movies that they like. The program then recommends a movie.

State the type of artificial intelligence program that is being used to recommend a movie.   **1**

(*c*) MovieMania is thinking of using a chatterbot facility to provide information about new movie releases.

State **one** early example of a program that used language processing.   **1**

    (4)

19. The theme park DareParc has launched a number of new rides. This knowledge base contains some facts and rules about the new rides and events.

1	type(infinity,thrill).	(*infinity is a thrill ride*)
2	type(pirates, water).	
3	type(coralreef,water).	
4	type(hauntedhouse,fright).	
5	family_fun(farmland).	(*farmland is a family fun event*)
6	family-fun(crazygolf).	
7	suitable_for(infinity,adults).	(*infinity is suitable for adults*)
8	suitable_for(pirates,teenagers).	
9	suitable_for(coralreef,children).	
10	suitable_for(hauntedhouse,children)	
11	half_price(X) if family_fun(X).	(*ride X is half price if it is a family fun event*)
12	with_adult(X) if type(X,water) and suitable_for(X,children).	(*ride X needs an adult if ride X is a water ride and ride X is suitable for children*)

(*a*)　(i)　State the result of the following query:

　　　?type(pirates,fright).　　　　　　　　　　　　　　　**1**

　　(ii)　State the first result of the following query:

　　　?half_price(X).　　　　　　　　　　　　　　　　**1**

(*b*)　Using the numbering system to help you, *trace* how the system will evaluate the following query as far as the first solution:

　　?with_adult(X)　　　　　　　　　　　　　　　　　**4**

(*c*)　The knowledge base is updated to include facts about the following new ride:

　　Domino is a thrill ride suitable for adults.

　　Write **two** facts that should be added to the knowledge base.　**2**

(*d*)　One way of representing information before creating a knowledge base is by using a *semantic net*.

　　Draw a semantic net to represent the facts about DareParc hotel:

　　　has(hotel, pool).
　　　has(hotel, restaurant).
　　　serves(restaurant, seafood).　　　　　　　　　　　**3**

　　　　　　　　　　　　　　　　　　　　　　　　(11)

[*END OF SECTION III—PART A—ARTIFICIAL INTELLIGENCE*]

SECTION III

Part B—Computer Networking

Attempt ALL questions in this section.

20. A local vet implants microchips into animals which contain data such as name, address and age. The microchip also contains a tracking device so the animal can be found if lost.

(*a*) (i) Name the type of network that would be used for the tracking device. **1**

(ii) The type of transmission used for tracking the animal is *unicast*.

Explain why unicast is used. **1**

(*b*) The vet uses a mobile phone to *e-mail* customers. The vet's e-mail address is:

B_Ark@vetworld.com.

(i) State the domain name of this e-mail address. **1**

(ii) State **two** benefits to the vet of using e-mail to communicate with customers. **2**

(iii) The vet's phone uses *WAP* technology.

What do the letters WAP stand for? **1**

(*c*) The vet's surgery has a smart fridge that stores medicines. This fridge can order new medicines online when stocks are low.

What term is used to describe this example? **1**

(7)

21. Queenshill school runs a website club. The students create web pages and publish them on the *World Wide Web* (*WWW*) when completed.

(*a*) Explain why the school needs an *ISP*. **1**

(*b*) State the type of software required to view the web pages. **1**

(*c*) The students must sign an IT user contract before they can join the club.

State **two** items that should be included in this contract. **2**

(*d*) The students create a *URL* for their web page.

State the purpose of a URL. **1**

(*e*) The students allow advertising on their web pages.

Name the type of *e-commerce* service provided. **1**

(*f*) Students often buy goods online.

State **one** benefit to the students of buying goods online. **1**

(*g*) The school is concerned that the computers may become infected with viruses.

State **one** method that could be used to help prevent computer viruses. **1**

(8)

[Turn over

22. (*a*) The Scotia Bank uses data encryption across its network of computers.

State **one** limitation of sending encrypted files. **1**

(*b*) As part of the bank's *backup strategy* it uses a fireproof safe.

Describe **two** additional steps to ensure an effective backup strategy. **2**

(*c*) A network technician suggests that the bank use a *leased line* instead of *ADSL* for their Internet connection.

(i) Explain how using a leased line would improve security. **1**

(ii) State **one** disadvantage of using a leased line. **1**

(*d*) A bank employee downloads a help document from the Internet.

(i) Name the Internet service being used. **1**

(ii) The employee uses this document to help him create macros within the bank's spreadsheet.

State **one** example of a task that a macro could perform within the spreadsheet. **1**

(*e*) The bank is concerned that employees are using the Internet at work for personal use.

State **one** measure the bank could take to prevent Internet misuse. **1**

(*f*) The *Regulation of Investigatory Powers Act* enables the government to monitor Internet use.

State **two** powers this Act provides the government with to monitor employees' Internet use. **2**
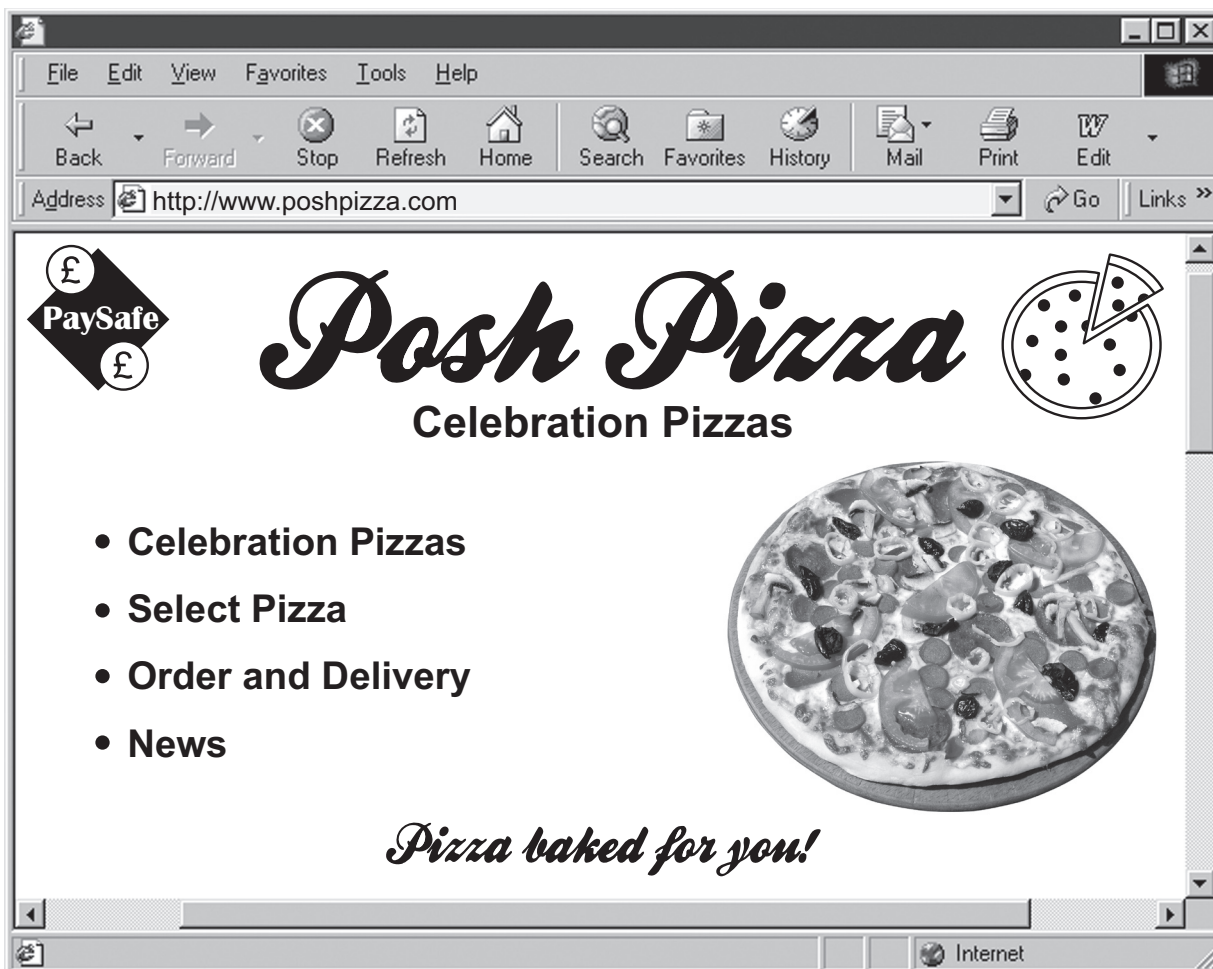
(10)

[*END OF SECTION III—PART B—COMPUTER NETWORKING*]

[Turn over for Question 23 on *Page sixteen*

SECTION III

Part C—Multimedia Technology

Attempt ALL questions in this section.

23. DynamoDesign has created a website for the local pizza restaurant.

(*a*) A digital camera is used to take photographs of the pizzas.

(i) Describe the purpose of a *charged coupled device* (CCD) in a digital camera. **1**

(ii) Each photograph takes up 36,524,407 bits of memory.

Calculate how many Megabytes of memory are equal to 36,524,407 bits. **Show all working.** **2**

(iii) Describe the effect of increasing the resolution of this photograph on the file size. **1**

(iv) Name the **type** of storage used to store photographs within the camera. **1**
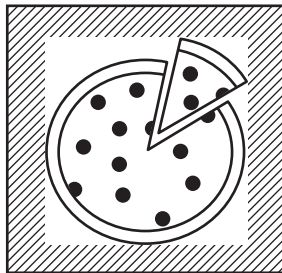
23. (continued)

(*b*) DynamoDesign uses a *text editor* to create the website.

   (i) Describe how a text editor could be used to create the website.   **1**

   (ii) Name **one** other type of editor that could be used by DynamoDesign to create the website.   **1**
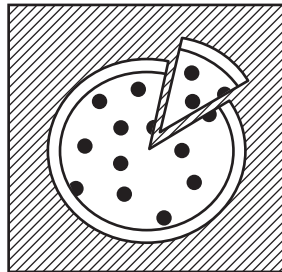
(*c*) The logo for the website is saved in GIF format.

Logo A

Logo A is altered so that the background pattern can be seen.

Logo B

   (i) Name the feature of GIF which allows the background pattern to be seen in Logo B.   **1**

   (ii) State **two** other features of the GIF file format.   **2**

(*d*) DynamoDesign adds 'My Favourite Pizza' option to the website.

Name the stage of the software development process that is being carried out.   **1**

   (11)

[Turn over

24. News4U creates video clips of local news events and then uploads them to a national news website.

    (*a*) News4U is recording video footage of a local charity race.

        Describe **one** suitable item of hardware that is needed to capture the video.   **1**

    (*b*) The video of a local charity race takes up 6·8 Gigabytes (Gb) and lasts for 20 minutes.

       (i) The video file was compressed using the MPEG format.

          State how MPEG compression reduces the file size.   **1**

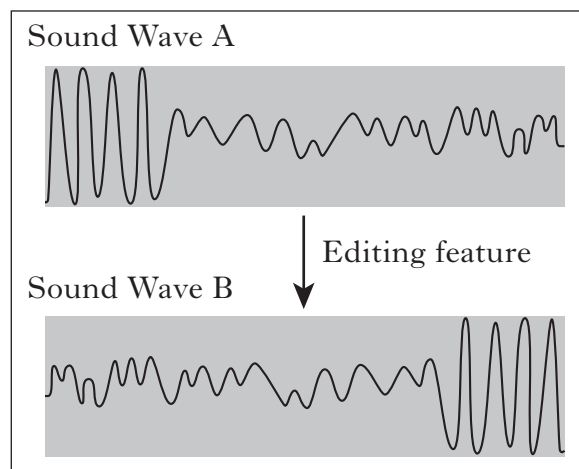   (ii) State **two** other ways that the video file size could be reduced.   **2**

     (iii) Explain how the video editing software could be used to reduce the video clip to 15 minutes.   **1**

    (*c*) A song by a local band is used as background music for the video clip.

       (i) The software used to edit the band's song has a number of editing features.

          Name the editing feature that changed Sound Wave A into Sound Wave B.

                                                1

      (ii) The keyboard track for the video clip is stored as a MIDI file.

         State **one** attribute of a MIDI instruction.   **1**

     (iii) The sound file is saved in an uncompressed format.

         State **one** advantage of an uncompressed format.   **1**

     (iv) Name the hardware that is needed to output sound from speakers.   **1**
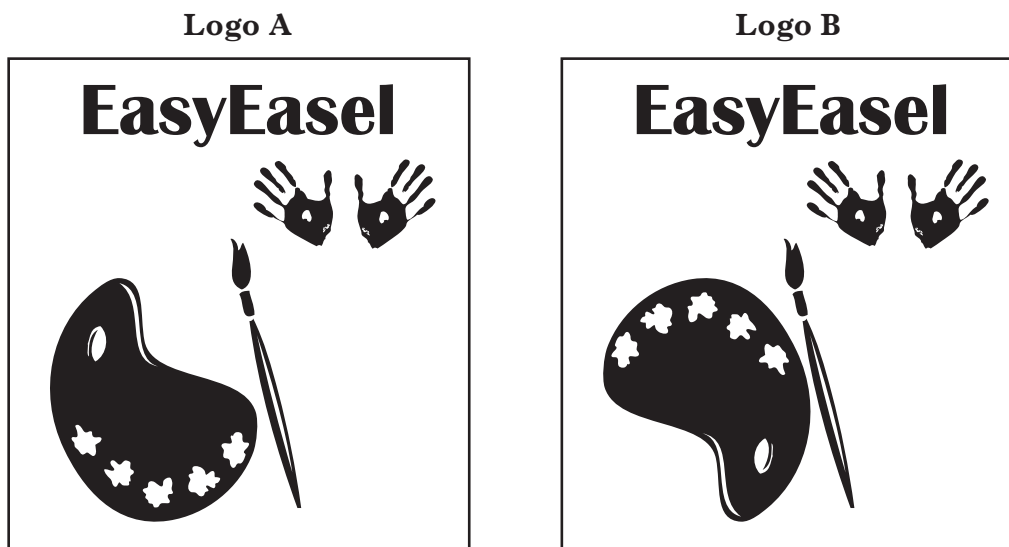
    (*d*) The video clip of the charity race can be viewed on a mobile phone.

        State the term used to describe a mobile phone that has similar functions to a palmtop computer system.   **1**

                                                (10)

25. A logo has been created for a graphics design company using a *vector graphics package*.

Logo A   **Logo B**

(*a*) Logo A was drawn and then edited to produce Logo B.

  (i) Describe how Logo B was created from Logo A. **1**

  (ii) If the logo is increased in size, state what effect this would have on the quality when printed. **1**

  (iii) State one other advantage of using a vector graphic package rather than a bit-mapped graphics package for creating this logo. **1**

(*b*) *VRML* is a graphics file type.

State what the letters VRML stand for. **1**

(4)

[*END OF SECTION III—PART C—MULTIMEDIA TECHNOLOGY*]

[*END OF QUESTION PAPER*]

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