X206/201

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.

SECTION I

Attempt ALL questions in this section.

1. Arrange the following *memory capacities* into order from the smallest to the biggest.

   terabyte   **kilobyte**   **megabyte**   **1**

2. State **one** method of spreading a computer virus.   **1**

3. Name the part of the processor where data is stored temporarily.   **1**

4. Maria uses both a laptop and a palmtop computer to store data for her business.

   State **one** *input device* that you would find on a laptop but not on a palmtop.   **1**

5. State **one** *standard file format* that could be used to save a word processed file.   **1**

6. Convert the binary number 11011 into a decimal number.   **1**

7. Name **one** *input device* that could be used to capture a graphic.   **1**

8. A bank's employee is checking that a computer has enough RAM to load a new software package.

   Name the document produced with the software that could help the employee.   **1**

9. *Macros* can be set up when using applications.

   Describe **one** method of creating and using a macro.   **2**

10. *Normal* and *extreme* data are used to test a computer program.

    State **one** other type of test data that should be used to test the program.   **1**

11. A program has been created to allow student details to be stored.

   (*a*) State the *variable type* that should be used to store the address of a student. **1**

   (*b*) State **one** method a programmer could use to make the program *readable*. **1**

12. The following is a line of pseudocode used to calculate the volume of a cuboid:

   volume = height multiplied by length squared

   Using an appropriate high level language with which you are familiar, write **program code** for this step of the pseudocode above. **2**

   (15)

[*END OF SECTION I*]

[Turn over for Section II

SECTION II

Attempt ALL questions in this section.

13. Each contestant in the game show "Total Knockout" must compete in five events. A program has been created to calculate the total and average points for each contestant.

The pseudocode for part of this program is shown below.

2.1.	loop 5 times
2.2.	get event points
2.3.	add points to total
2.4.	end loop
2.5.	calculate average points
2.6.	display total and average points

(*a*) Name **one other** *design notation* that could have been used.   **1**

(*b*) Steps 2.1 and 2.4 are the beginning and the end of a *fixed loop*.

Explain why a fixed loop is used here.   **1**

(*c*) Using a high level language with which you are familiar, write the line of **program code** for step 2.5 of the algorithm.   **2**

(*d*) The names of 50 contestants have to be stored.

State the data structure that should be used to store all the contestants' names.   **1**

(*e*) The program design is updated to display an error message if the points entered are not in the range 5 to 25 inclusive. Step 2.2 of the algorithm is refined to include the *conditional statement* shown below.

IF (points<5) AND (points>=25) THEN
display error message
END IF

(i) Identify **two** mistakes made in the above pseudocode.   **2**

(ii) Name the *standard algorithm* that is used to check that values entered are within a correct range.   **1**

(iii) The program is to be tested using 8 and 21 as examples of *normal* test data for the points.

State **two** numbers that should be used for *extreme* test data.   **2**

13. (continued)

    (*f*) A *text editor* is used at the implementation stage.

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

    (*g*) Each contestant is given a certificate at the end of the game show.
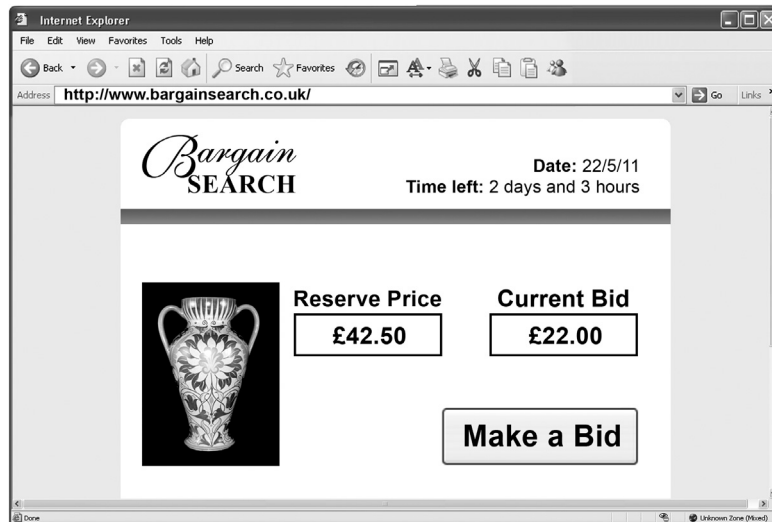
        State **one** reason why a laser printer is used to print a certificate for each of the 50 contestants rather than an inkjet printer.   **1**

                                                     (12)

14. Antiques can be bought and sold on the BargainSearch website.

(*a*) Kamila is selling her antique vase. She has taken a black and white photograph of the vase. The photograph measures 2 inches by 3 inches and has a resolution of 800 dpi.

   (i) Calculate the storage requirements of the photograph in Kilobytes.

   Show all working. **3**

   (ii) Kamila uploaded her photograph to the website. The camera was connected to her computer system through a USB *interface*.

   State **one** function of an interface. **1**

(*b*) The reserve price of the vase is £42·50.

State how a real number such as 42·50 would be represented in the computer. **1**

(*c*) A computer program is written in a high level programming language to keep track of the bids for each antique.

   (i) Name the *standard algorithm* that is required to find the highest bid. **1**

   (ii) State **one** advantage of writing the program in a high level language rather than in machine code. **1**

   (iii) The *user interface* for the program is planned on paper.

   State which stage of the software development process is being carried out. **1**

   (iv) The completed program is compiled.

   Describe how a *compiler* translates a high level language program into machine code. **1**

(*d*) Name the legislation that BargainSearch must comply with when storing customer information. **1**

(10)

15. RepairIT uses application software to create an advert.

(*a*) The advert shown above was created using a graphics package.

From this advert, identify **one** object and **one** operation that may have been carried out on that object. **2**

(*b*) RepairIT sends the advert to their regular customers by e-mail.

State **one** feature of e-mail that would allow RepairIT to send the advert to all its customers in one operation. **1**

(*c*) RepairIT is advertising the Vision 2011 *operating system*.

State **two** functions of an operating system. **2**

(*d*) RepairIT is setting up a *LAN* in the resource centre of the local library.

(i) State **one** advantage of using a LAN instead of stand-alone computers. **1**

(ii) One computer is to be used as the *file server*.

Describe **one** function of a file server. **1**

(*e*) RepairIT offers free *anti-virus software* with every purchase.

Describe **one** purpose of anti-virus software. **1**

(8)

[*END OF SECTION II*]

[Turn over

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SECTION III

Attempt ONE part of Section III

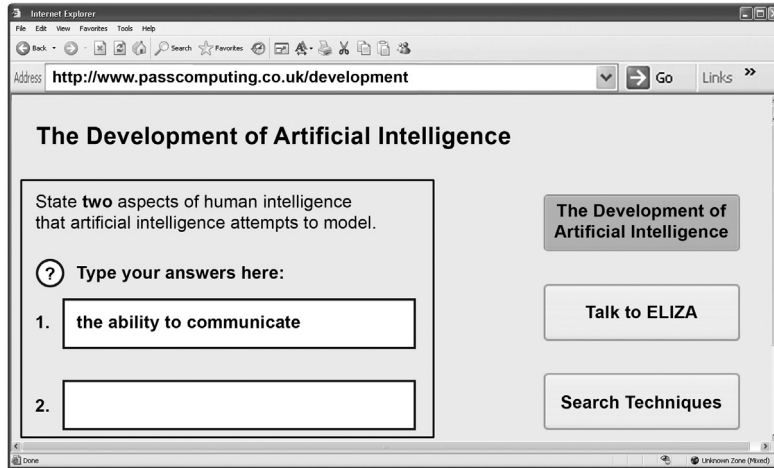Choose **one** part and answer **all** of the questions in that part.

Part A—Artificial Intelligence

Attempt ALL questions in this section.

16. Sanjeev is revising for his artificial intelligence assessment using the website PassComputing.
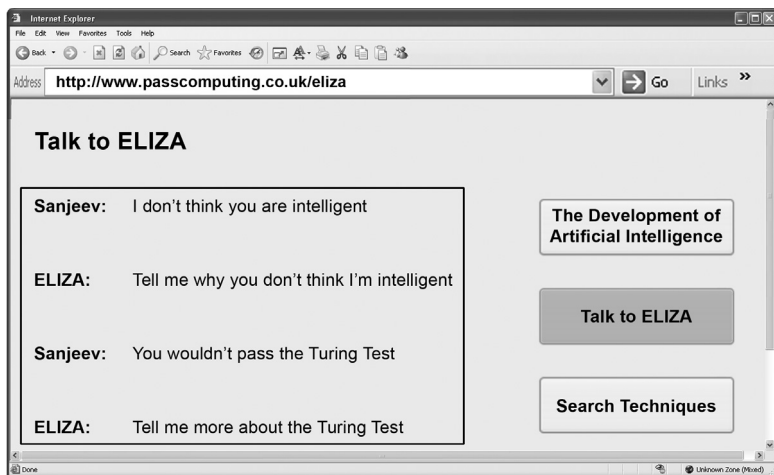

(*a*) Sanjeev selects "The Development of Artificial Intelligence" button. He types "the ability to communicate" as his first answer.

State **one other** aspect of human intelligence that artificial intelligence attempts to model. **1**

(*b*) Sanjeev selects the "Talk to ELIZA" button. ELIZA was one of the first examples of a natural language processing application.

(i) ELIZA would not pass the *Turing Test*.

Describe the Turing Test. **2**

(ii) Describe **one** reason why ELIZA shows only limited intelligence. **1**

(iii) State **one** recent type of language processing application. **1**

(*c*) Sanjeev downloads revision notes.

State **one** suitable backing storage device for storing the downloaded files. **1**

17. Mr MacDonald is testing a new robotic farmer called CropMaster. CropMaster sprays crops, removes weeds and picks fruit.

   (*a*) (i) State **one** application of artificial intelligence that CropMaster could use to identify the weeds.   **1**

        (ii) Describe **one** problem that could affect the accuracy of CropMaster in correctly identifying the weeds.   **1**

   (*b*) CropMaster uses an *Artificial Neural System* to help forecast the weather so that the farmer can decide when to harvest his crops.

        (i) What is an Artificial Neural System?   **1**

        (ii) State **one** disadvantage of using an Artificial Neural System for this purpose.   **1**

   (*c*) After testing CropMaster for two months, Mr MacDonald is asked to comment on how effective the robotic farmer is at identifying weeds.

      State which stage of the software development process is being carried out.   **1**

   (*d*) Mr MacDonald also uses an expert system called HealthyHerd to help him diagnose illnesses in his farm animals.

        (i) State **two** advantages to the farmer of using the expert system HealthyHerd rather than consulting a vet.   **2**

        (ii) State **one** example of a hardware development, other than higher capacity hard drives, that has allowed expert systems to be more effective.   **1**

            (8)

[Turn over

18. CoolCamera offers discounted digital cameras and printers. The knowledge base holds facts and rules about cameras on offer.

1	cost(maxpix, 110).	(*camera maxpix costs £110*)
2	cost(megashoot, 220).	
3	cost(powershoot, 105).	
4	cost(photomaster, 225).	
5	oldmodel(fastpics).	(*camera fastpics is an old model*)
6	oldmodel(compactcamera).	
7	megapixels(maxpix, 4).	(*camera maxpix has 4 megapixels*)
8	megapixels(megashoot, 6).	
9	megapixels(powershoot, 12).	
10	megapixels(photomaster, 10).	
11	free_printer(X) if oldmodel(X).	(*camera X gets a free printer if X is an old model*)
12	special_deal(X) if cost(X,Y) and Y>200.	(*camera X is a special deal if X is a camera with cost Y and Y is greater than £200*)

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

? cost(megashoot, 120).   **1**

(ii) State the result of the following query:

? megapixels(X, 12).   **1**

(*b*) State the **first** result of the following query:

? free_printer(X).   **1**

(*c*) Using the numbering system to help you, trace how the system will evaluate the query:

? special_deal(X).

as far as the **first** solution.   **4**

(*d*) Editing software is free with cameras that have more than 10 megapixels.

Use this information to complete the rule:

free_software(X)   **2**

(*e*) The knowledge base was written in a declarative language that uses *depth first search*.

Describe what is meant by a depth first search. You may use a diagram to illustrate your answer.   **2**

(11)

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

SECTION III

Part B—Computer Networking

Attempt ALL questions in this section.

19. Eilidh uses a mobile phone, mp3 player and laptop to communicate and play music.

(*a*) Eilidh speaks to a friend using her mobile phone.

Explain why this is an example of *unicast transmission*. **1**

(*b*) Eilidh also uses her mobile phone to access the World Wide Web.

Name the type of software Eilidh is using to access and view web pages on her mobile phone. **1**

(*c*) Eilidh can connect her mobile phone, mp3 player and laptop wirelessly so that she can share data.

  (i) Name this type of network. **1**

  (ii) Name the hardware that must be installed in each of these devices to allow wireless communication. **1**

(*d*) State **one** example of *file transfer* when Eilidh is using her mobile phone, mp3 player or laptop. **1**

(5)

[Turn over

20. A website has been created for Lowland High School.

(*a*) Name the stage of the software development process at which the website is created. **1**

(*b*) The school requires an *ISP*.

 (i) What does ISP stand for? **1**

 (ii) Explain why the school requires an ISP. **1**

(*c*) The school's website *URL* is:

http://www.lowlandhs.sch.uk

What does URL stand for? **1**

When the website is loaded, the home page is displayed. The home page is shown below.

(*d*) Name the part of the computer that stores this home page when it is loaded. **1**

(*e*) State the method of *navigation* used in this home page. **1**

(*f*) The Head Teacher only wants staff to have access to the reports page.

State **one** *software security measure* that could be taken to ensure that only staff can access this web page. **1**

(*g*) The school sells calendars, pens and diaries via the website.

Name the type of *e-commerce* service that the school is providing. **1**

(*h*) State **one** reason why the school may require *Internet filtering*. **1**

(9)

21. UPac is a packaging company which has decided to sell goods online.

(*a*) State **two** *financial* benefits to UPac of selling goods online.   **2**

(*b*) Name **one** *type of connection* UPac's computers should use to ensure fast Internet access.   **1**

(*c*) Explain why *encryption* is used when sending confidential files across the Internet.   **1**

(*d*) Staff are trained on an appropriate code of conduct when using the Internet.

Suggest **two** ways in which the staff could break this code of conduct.   **2**

(*e*) UPac uses *Domain Name Services* (DNS) to provide *host name resolution* across their network.

State **one** benefit to UPac of using host name resolution.   **1**

(*f*) UPac has been advised to make a backup of their data.

  (i)   State **two** reasons why UPac need to backup their data.   **2**

  (ii) UPac uses a tape drive to backup their data.

      Describe a suitable backup strategy UPac could use.   **2**

(11)

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

SECTION III

Part C—Multimedia Technology

Attempt ALL questions in this section.

22. Murdo has created a *presentation* to demonstrate what it is like to work on a trawler. One of the pages is shown below.

(a) Murdo asks his friends to check that the video clips are working properly.

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

(b) Murdo used a *digital camera* to capture the photograph of the boat.

Name the **type** of storage used to store this photograph within the camera. **1**

(c) Image A has been edited to produce Image B.

Image A   **Image B**

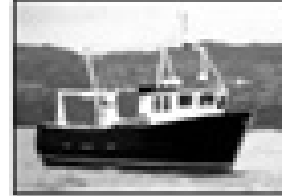   (i)   State the *image editing* feature that has been used to produce Image B. **1**

22. **(*c*) (continued)**

Image B has been edited to produce Image C.

Image B	**Image C**

(ii) State the *image editing* feature that has been used to produce Image C.   **1**

(iii) State the effect on the file size after Image B is edited to produce Image C.   **1**

Each video clip in the presentation can play for 30 minutes.

(*d*) State the hardware device that must be installed within the computer before the video can play.   **1**

(*e*) Murdo wants to take his presentation to a college.

(i) State the most appropriate type of *backing storage media* that he should use.   **1**

(ii) Murdo copies his presentation onto one of the computers at the college. Unfortunately the file will not run on the college's computer.

State **one** reason why this could have happened.   **1**

(*f*) Murdo wants to create a web page using the information in his presentation. He decides to use a *WYSIWYG editor*.

(i) Name **one** other type of editor Murdo could use.   **1**

(ii) State **one** benefit to Murdo of using a WYSIWYG editor to create the web page in this case.   **1**

(10)

[Turn over

23. An orchestra is recording a new song using digital technology.

(*a*) Name **two** hardware devices that the computer must have in order to capture sound. **2**

(*b*) The orchestra play back the recorded song. They notice that the quality of the recording is poor. It is decided to increase the *sampling depth*.

   (i) State **one** implication of increasing the sampling depth. **1**

   (ii) Suggest **one** other method that could be used to improve the quality when recording sound. **1**

(*c*) The song is edited using *sound editing software*. Name **one** feature of sound editing software that will allow the song to be edited. **1**

(*d*) A musician suggests using a *MIDI keyboard* to create the song.

State **one** benefit of using a MIDI keyboard. **1**

(*e*) The orchestra use a *digital video camera* to create a video for the song.

   (i) State **one** benefit of using a digital video camera rather than a *webcam* to capture this video. **1**

   (ii) Name **one** *compressed file format* for storing video. **1**

(8)

24. A *vector graphics package* has been used to create the following logos for a bicycle company.
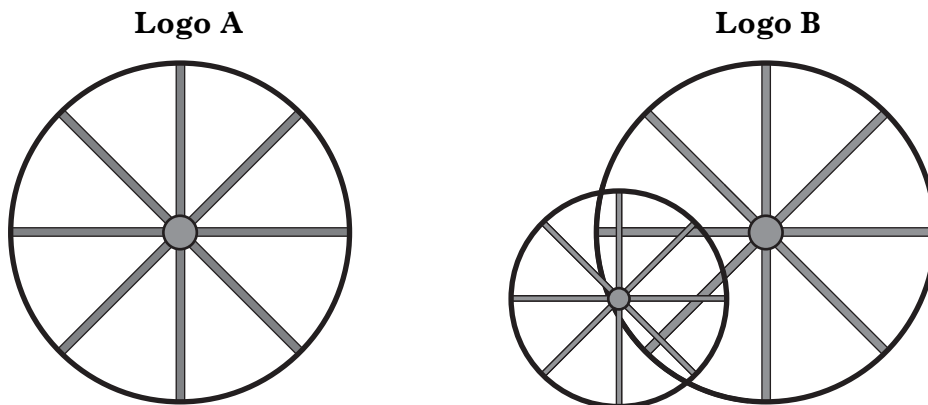
(*a*) State **one** reason why a *bit-mapped package* would **not** be appropriate for creating these logos.   **1**

(*b*) Name **two** features of a vector graphics package that have been used to produce Logo B from Logo A.   **2**

(*c*) Name **one** file type that could be used to store vector graphics.   **1**

(*d*) Name **one** attribute that is unique to a 3D graphic but not a 2D graphic.   **1**

(*e*) Explain why *compression* is often used with *bit-mapped* graphics.   **1**

(*f*) State the law that protects the bicycle company's logos from being used by another company without their permission.   **1**

(7)

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

[*END OF QUESTION PAPER*]

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