X206/11/01

NATIONAL QUALIFICATIONS 2014

FRIDAY, 23 MAY
9.00 AM – 10.30 AM

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.

Marks

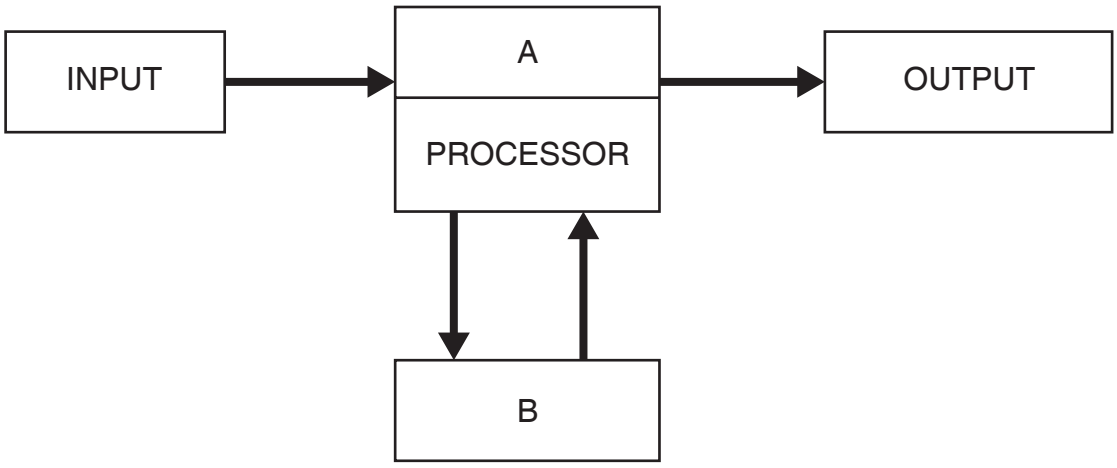
SECTION I

Attempt ALL questions in this section.

1. State **one** advantage of using binary numbers rather than decimal numbers in a computer system. **1**

2. State how many bits ASCII uses to store a character. **1**

3. The following is the five box diagram that represents the structure of a computer system.



(*a*) Name part A. **1**

(*b*) Name part B. **1**

4. State **one** advantage of using a laser printer compared to an ink-jet printer. **1**

5. A company's computers have been networked to allow users to share files. State **two** further benefits to the company of networking their computers **2**

6. Explain why standard file formats are recommended when saving files **1**

7. Name the first **two** stages of the software development process. **2**

8. Jules has completed a computer program using a high level language. Explain what must happen to this program before it can be run on her computer. **1**

Marks

9. A set of 50 exam results needs to be stored within a program.

(*a*) Name the data structure required to store this set within the program. **1**

(*b*) Name the standard algorithm required to find the number of pupils who have achieved 50% or more. **1**

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

11. A selection of code is shown below.

```
1 0 1 0 1 1 0 0
1 0 1 0 1 0 0 1
1 0 1 1 1 0 1 0
0 0 0 0 1 0 1 1
```

State the type of programming language this code has been written in. **1**

[Turn over

[*END OF SECTION I*]

Marks

SECTION II

Attempt ALL questions in this section.

12. An airport uses a webcam to capture a photograph of each traveller's face. At the destination airport this photograph is shown to a security guard to confirm the traveller's identity

(*a*) State **one** reason why a webcam is used rather than a digital camera. **1**

(*b*) The software used to take the photograph has been set up with macros.

(i) Describe **one** method of creating a macro. **1**

(ii) Describe **one** method of using a macro. **1**

(iii) State **one** benefit to the airport staff of using macros. **1**

(*c*) State **one** device that could be used to view the traveller's photograph at the destination airport. **1**

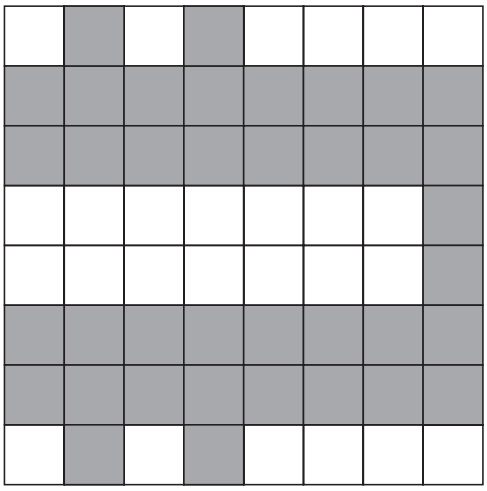
(*d*) The computers between the airports are networked.

(i) State the type of network used. **1**

(ii) Explain why high *bandwidth* is an important factor when sending the photographs from one airport to another. **1**

(*e*) On occasion airport staff save the photographs onto an optical disc that cannot be overwritten. State **one** appropriate optical disc for this task. **1**

(*f*) The airport logo is included on the photographs. This logo is black and white and stored as a *bit map*.



Each box above represents a pixel.

(i) Describe how this bit map graphic is stored. **1**

(ii) Calculate how many bytes are required to store this logo. **2**

(11)

Marks

13. Pavel upgrades a computer system to the following specification:

12 inch LCD monitor
2.6 Processor
8 Gb RAM
500 Gb Hard disk drive
Touchpad

(*a*) State the type of computer system above. **1**

(*b*) (i) State the appropriate units that should be used for the processor. **1**

(ii) State **two** parts of a processor. **2**

(*c*) *RAM* and *ROM* are used on this computer.

(i) Describe **one** difference between ROM and RAM. **1**

(ii) Suggest **one** use for ROM. **1**

(*d*) Pavel designs and creates program code.

(i) Name **two** *design notations* that Pavel could use. **2**

(ii) Explain why Pavel prefers to use *high level languages* rather than *machine code* when creating programs. **1**

(9)

[Turn over

Marks

14. GameStar is a software company that creates computer games.

(*a*) Before starting a game, the user must create a password of at least 8 characters.

(i) State the *standard algorithm* used to check the length of the password. **1**

Part of this standard algorithm is shown below:

```
1.1   REPEAT
1.2         get password
1.3         calculate password length
1.4         If passwordlength < 8 THEN
1.5               display error message
1.6         END IF
1.7   UNTIL _____________________________
```

(ii) Name the type of design notation used above. **1**

(iii) Complete step 1.7 of the algorithm. **1**

(iv) Steps 1.1 and 1.7 are the beginning and end of a conditional loop. Explain why a conditional loop is used here. **1**

(v) State the variable type that should be used to store the users password. **1**

(*b*) GameStar is currently working on a health game. To win the game, the character must collect at least 5 pieces of fruit and at least 5 vegetables.

Part of the algorithm to end the game is shown below:

```
2.1         IF fruit > 5 OR vegetables > 5 THEN
2.2               display "You have won!"
2.3         END IF
```

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

(ii) A new version of the game is to be released next year.

Name the stage of the software development process that is involved when creating the new version. **1**

(iii) State a feature of program code that would assist the programmers when upgrading the program. **1**

Marks

14. (continued)

(*c*) State **one** reason why a technical guide would be distributed with the new game software. **1**

(10)

[*END OF SECTION II*]

[Turn over

SECTION III

Attempt ONE part of Section III

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

Marks

SECTION III

Part A—Artificial Intelligence

Attempt ALL questions in this section.

15. Sea-Alert uses artificial intelligence to monitor pollution in the Mediterranean Sea.

(*a*) Satellite photographs of the Mediterranean Sea are studied daily to check for new oil spills.

(i) State the area of artificial intelligence that is being used for this task. **1**

(ii) Identify **one** issue that might make identification of oil spills from the satellite photographs difficult. **1**

(*b*) The intelligent robot, Sea Glider, is used to detect and then disperse small oil spills.

(i) State **one** type of sensor that could be used for this task. **1**

(ii) Describe **one** advantage of using an intelligent robot for this task rather than a robot with no intelligence. **1**

(*c*) State **one** aspect of human intelligence that artificial intelligence applications aim to copy. **1**

(5)

[Turn over

Marks

16. Braeness International Airport uses artificial intelligence for automated ticket sales and check-in.

(*a*) Speech recognition is used in the automated ticket machines. Describe **two** problems that might make communication with the ticket machine difficult. **2**

(*b*) An *Artificial Neural System* is used to speed up airport check-in by identifying fingerprints.

(i) Explain what is meant by an Artificial Neural System. **1**

(ii) State **one** benefit of using an Artificial Neural System for identifying fingerprints. **1**

(*c*) State **one** example of a hardware development, other than larger capacity backing storage, that has allowed Artificial Neural Systems to be developed. **1**

(5)

Marks

17. TalkWare has 150 mobile phone shops in the UK. The company has launched a website to sell its mobile phones.

(*a*) Customers make selections on the website and then the expert system finds the best mobile phone deal.

(i) State **two** advantages to the **customer** of using this expert system rather than contacting the company. **2**

(ii) State **one** concern that employees of the company might have about the introduction of the expert system. **1**

(*b*) The website has a chatterbot facility to discuss suitable products for the customer. Explain why early language programs such as ELIZA would **not** be suitable for this task. **1**

(*c*) TalkWare sends monthly updates by e-mail to its regular customers. State the most efficient way for the company to send the latest updates to all its customers by e-mail. **1**

(5)

[Turn over

Marks

18. The insurance company iSure offers vehicle insurance. The knowledge base contains facts and rules about policies on offer.

1	drives(sam,motorbike).	(*Sam drives a motorbike*)
2	drives(jane,car)	
3	drives(emily,car)	
4	drives(john,car)	
5	no_claims(john)	(*John has a no claims bonus*)
6	no_claims(emily)	
7	age(john,18)	(*John is 18 years old*)
8	age(sam,31)	
9	age(emily,25)	
10	age(jane,48)	
11	discount(X) if no_claims(X)	(*X should get a discount if X has a no claims bonus*)
12	gold_policy(X) if drives (X,car) and no_claims (X)	(*X should get a gold policy if X drives a car and X has no claims*)

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

? drives(emily,car). **1**

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

?discount(X). **1**

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

?gold_policy(X)

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

(*c*) The company does not insure motorbike drivers under 25 years old.

Use this information to complete this rule:

no_policy(X) **2**

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

(i) State **one** advantage of a depth-first search compared to a breadth-first search. **1**

(ii) State **one** disadvantage of a depth-first search compared to a breadth-first search. **1**

(10)

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

Marks

SECTION III

Part B—Computer Networking

Attempt ALL questions in this section.

19. The Daily News company uses a computer network for file sharing, communication and *e-business*.

(*a*) Describe what is meant by e-business. **1**

(*b*) The journalists use application software to create text based stories for the newspapers.

(i) Name the most appropriate application package the journalists would use. **1**

(ii) The journalists use *e-mail* to send their files to the editor.

Name the feature of e-mail used. **1**

(iii) The journalists use data *encryption* when sending their files.

State what the editor needs to decrypt the files. **1**

(*c*) The company's website includes video footage of news events.

Explain why a *broadband* connection is required to view video footage on the website. **1**

(*d*) The Daily News' website has a search facility:

A user wishes to find out which country is hosting the Commonwealth Games in 2018.

Describe the **most efficient** way of finding this information using the company's *search engine*. **2**

(*e*) Journalists can make use of different computer systems when reporting events.

(i) Name a type of computer system that would use a *microbrowser*. **1**

(ii) Describe **one** difference between a microbrowser and a *browser*. **1**

(9)

[Turn over

Marks

20. FonesRUs advertises a new tablet computer on its website.

New Features
- *Touchscreen*
- *Apps*
- *Games*
- *Control home appliances*

The *user interface* of the tablet computer has been evaluated.

(*a*) (i) Explain why evaluating the user interface is important. **1**

(ii) State **one** type of home appliance the tablet computer may be able to control. **1**

(*b*) The company sends an e-mail to all its customers to advertise the new tablet computer.

Explain why *multicast* transmission is used. **1**

(*c*) The company's profits have increased from online sales.

(i) State **one** reason why online sales have increased profits. **1**

(ii) State **one** cost to the company of using the Internet for their tablet computer sales. **1**

(*d*) The tablet computers use *DNS* to access web pages.

(i) What do the letters DNS stand for? **1**

(ii) State **one** future problem of DNS. **1**

(*e*) State **one** way in which the *Regulation of Investigatory Powers Act* could be used to monitor staff e-mail. **1**

(8)

Marks

21. A university allows all staff and students access to the Internet, for file sharing and *e-mail*.

(*a*) Describe **one** *software security* measure the university could use to ensure authorised access only. **1**

(*b*) The maths and science departments connect devices without using cables in four lecture rooms.

(i) State the type of network used. **1**

(ii) *Wireless Network Interface Cards* (*WNICs*) are used to connect computers on this network.

Describe **one** task performed by a WNIC on this network. **1**

(iii) The departments are concerned that *hardware failure* may disrupt the network.

State **one** type of hardware failure that could affect the whole network. **1**

(*c*) The university's website allows online voice chat with lecturers to provide help for students.

(i) State **one** benefit of using voice transmission to provide online help. **1**

(ii) State **one** limitation of using voice transmission in this case. **1**

(*d*) Some students in remote areas only have access to dial-up connections at home.

(i) State **one** drawback of using dial-up connections. **1**

(ii) State **one** other type of Internet connection the students would like to use. **1**

(8)

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

[Turn over

Marks

SECTION III

Part C—Multimedia Technology

Attempt ALL questions in this section.

22. The website MasterLingo helps holidaymakers learn the basics of a foreign language.

(*a*) A WYSIWYG editor was used to create the website.

(i) Describe **one** benefit of using a WYSIWYG editor to create the website. **1**

(ii) State **one** other method that could have been used to create the website. **1**

(*b*) Holidaymakers can download an MP3 audio file of important words and phrases.

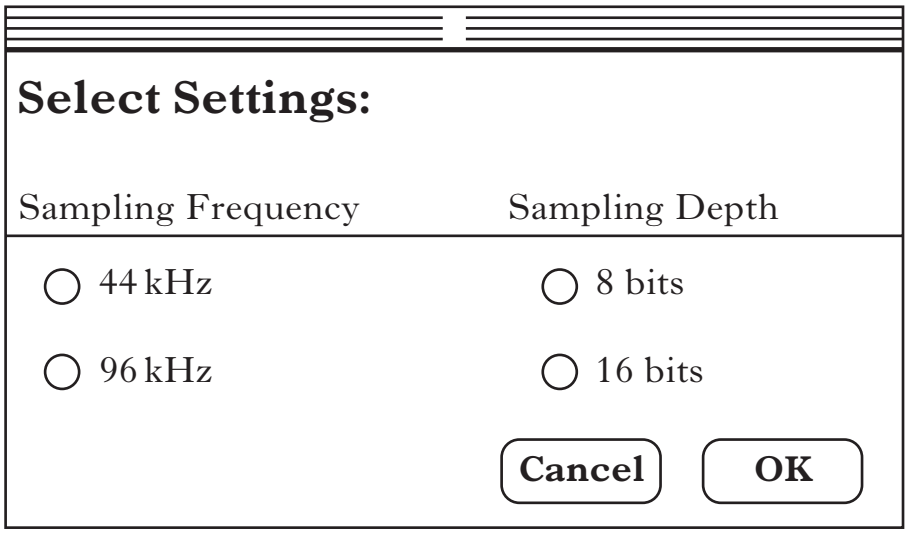
(i) Name the type of compression used by MP3. **1**

(ii) Explain why compression is used with the audio file. **1**

(iii) State a suitable backing storage medium for storing the audio file. **1**

22. (continued)

(*c*) Music has been recorded for the website using a microphone. The software allowed the *sampling frequency* and *sampling depth* to be altered



(i) In order to have the best sound quality, state what settings should be selected for the sampling frequency **and** sampling depth. **1**

(ii) What effect will recording the sound at the best quality have on the size of the sound file? **1**

(*d*) Instead of recording the sound with a microphone the music could have been synthesised.

(i) State **one** data format that would be used to store the information from the synthesised music. **1**

(ii) Describe **one** method of creating music in this way. **1**

(9)

[Turn over

Marks

23. EGallery is a 3D virtual reality guide to a new modern art gallery.

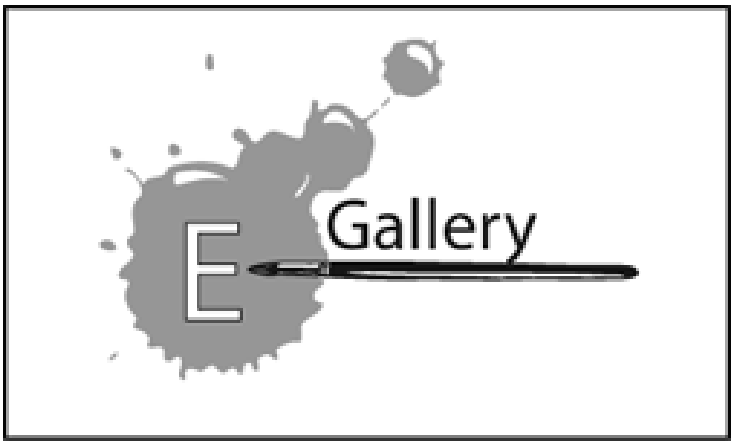
(*a*) Explain why a 3D virtual reality guide rather than a slideshow of images was chosen. **1**

(*b*) The virtual reality guide contains 3D vector images. One attribute of a 3D vector image is shape.

Name **one other** attribute of a 3D vector image. **1**

23. (continued)

(*c*) A *bit-mapped graphics package* was used to create a logo for EGallery.



(i) State **two** ways you could check that this logo has been produced using a bit-mapped graphics package rather than a vector graphics package. **2**

(ii) Name **one** tool that has been used to create this logo. **1**

(iii) State **one** reason why a vector graphics package would not have been suitable for creating this logo. **1**

(iv) This logo is displayed on a high resolution monitor.

State the item of hardware needed to display graphics on the monitor. **1**

(v) State the law that protects the logo from being used by another gallery without permission. **1**

(8)

[Turn over for Question (24) on *page twenty*

Marks

24. The National Police Academy is recording a video to recruit cadets, including an interview with the Police Chief.

(*a*) State **one** item of hardware that is needed to capture the video. **1**

(*b*) The video editing software allows the *colour depth* and *video time* to be changed.

(i) State what is meant by the term colour depth. **1**

(ii) State a feature of the video editing software that is used to reduce the video time. **1**

(iii) Describe the effect of reducing the video time on the video quality. **1**

(*c*) The edited video clip is 6.4 Gigabytes. It is compressed using MPEG format.

(i) Describe how MPEG compression reduces file size. **1**

(ii) State **one** example of an uncompressed video format. **1**

(*d*) The completed video clip is part of a multimedia application.

Name **one** type of software that could be used to view this multimedia application. **1**

(*e*) People interested in becoming a cadet can download an application form from the website. Application forms are saved using a *standard file format*.

State a suitable file format for saving this text file. **1**

(8)

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

[*END OF QUESTION PAPER*]

ACKNOWLEDGEMENT

Question 17 – 126412493 Shutterstock.com

Question 20 – 95028964 Shutterstock.com

Question 23 – Image of art gallery is taken from **http://www.postcardsrus.com/blog/post.cfm?id=31&how-to-market-your-art-gallery-in-print**.

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