

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.



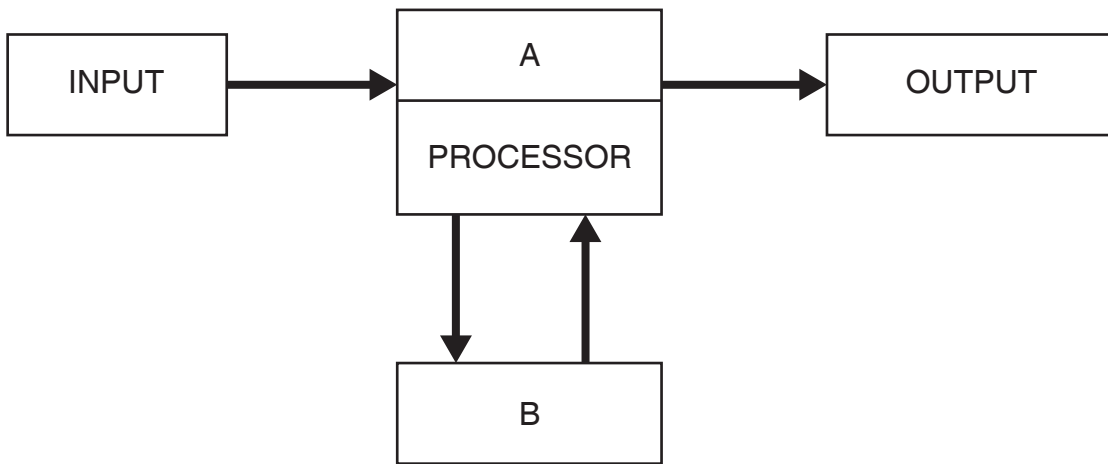
SECTION I

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

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.

$$\begin{array}{|cccccccc|} \hline 1 & 0 & 1 & 0 & 1 & 1 & 0 & 0 \\ 1 & 0 & 1 & 0 & 1 & 0 & 0 & 1 \\ 1 & 0 & 1 & 1 & 1 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 1 & 0 & 1 & 1 \\ \hline \end{array}$$

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

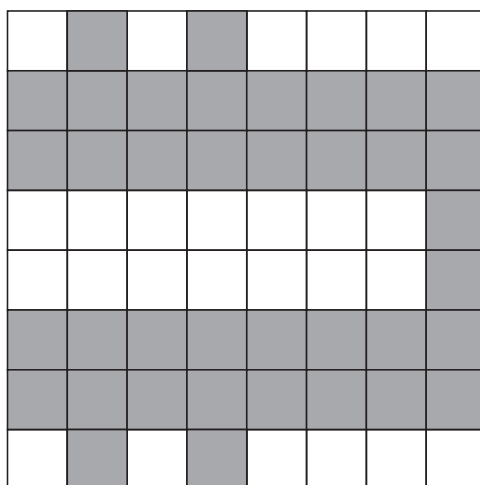
[Turn over

[END OF SECTION I]

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)

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

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**

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

Part A	Artificial Intelligence	Page 9	Questions 15 to 18
Part B	Computer Networking	Page 13	Questions 19 to 21
Part C	Multimedia Technology	Page 16	Questions 22 to 24

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

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

- 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)**

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

The screenshot shows a web browser window with the address bar displaying <http://www.talkware.co.uk>. The website content includes:

- TalkWare** logo at the top left.
- Contact us: 0123 456 789** at the top right.
- Find the Best Deals** section with three selection boxes:
 - Select payment plan:**
 - Pay Now
 - Pay Monthly
 - Select cost of phone:**
 - <£50
 - £50 - £100
 - >£100
 - Select number of texts:**
 - 100 per month
 - 200 per month
 - unlimited
- A **Next** button at the bottom right of the selection boxes.
- Ask Mr Phone** section featuring a cartoon character of a mobile phone with a face, arms, and legs, and the text **Online Assistance** below it.

- (a) Customers make selections on the website and then the expert system finds the best mobile phone deal.
- State **two** advantages to the **customer** of using this expert system rather than contacting the company. 2
 - 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

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]

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

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)**

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

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

Select Settings:	
Sampling Frequency	Sampling Depth
<input type="radio"/> 44 kHz	<input type="radio"/> 8 bits
<input type="radio"/> 96 kHz	<input type="radio"/> 16 bits
<input type="button" value="Cancel"/> <input type="button" value="OK"/>	

- (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

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



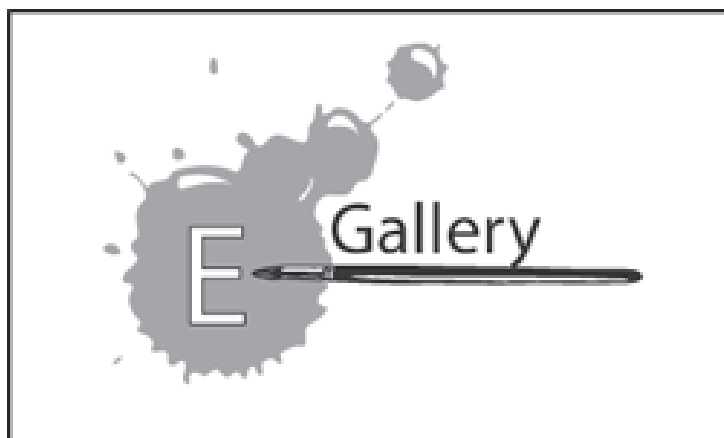
(a) Explain why a 3D virtual reality guide rather than a slideshow of images was chosen. 1

(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*]

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

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