

# X206/301

NATIONAL  
QUALIFICATIONS  
2007

MONDAY, 28 MAY  
1.00 PM – 3.30 PM

COMPUTING  
HIGHER

Attempt **all** questions in Section I.

Attempt **all** questions in Section II.

Attempt **one** sub-section of Section III.

Part A	Artificial Intelligence	Page 10	Questions 22 to 26
Part B	Computer Networking	Page 14	Questions 27 to 31
Part C	Multimedia Technology	Page 17	Questions 32 to 36

For the sub-section chosen, attempt **all** questions.

Read all questions carefully.

Do not write on the question paper.

Write as neatly as possible.

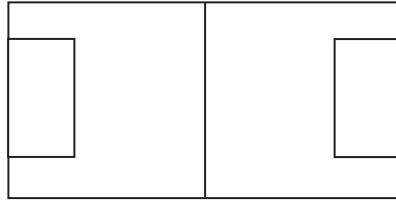


## SECTION I

Attempt all questions in this section.

Marks

1. Two versions of the image below have been created. One in a *bit-mapped* graphic package and the other in a *vector* graphic package.



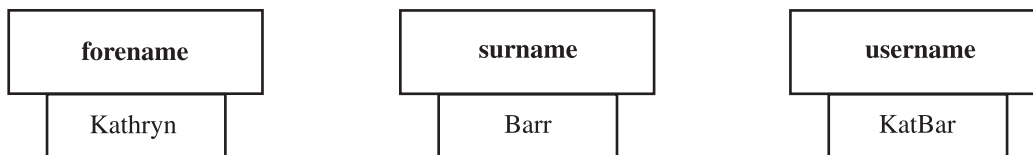
If a circle is added to the centre of the graphic, what is the effect on the file size in each case?

2

2. *ASCII* and *UNICODE* are both used to represent text in computer systems.
- (a) Describe one **advantage** of *UNICODE* over *ASCII*. 1
- (b) Describe one **disadvantage** of *UNICODE* over *ASCII*. 1
3. What is the **8 bit two's complement** representation of the number **-72**? 1
4. Explain why increasing the width of the *data bus* improves *system performance*. 1
5. The *read* and *write lines* are two *control lines*. Name **two** other control lines. 2
6. Describe how a printer *spooler* operates. 2
7. When a program is loaded from a hard disk drive into *RAM* which function of the *operating system* is responsible for ensuring that there is enough *RAM* available to load the file? 1
8. (a) Draw and label a diagram of a *mesh* network with five nodes. 1
- (b) Explain how the topology of a mesh network includes protection against the consequences of channel failure. 1
9. When a computer is switched on part of the operating system (*OS*) is already in memory.
- (a) What is the name given to the part of the *OS* that locates and loads the rest of the *OS* into memory? 1
- (b) State the **type** of virus that can affect the computer **during** the loading of the operating system. 1

## SECTION I (continued)

10. Software can be evaluated in terms of its *portability*. Describe what is meant by “portability”. 2
11. A software development company prefers to employ an *independent test group* during the test stage.
- (a) Describe what is meant by an “independent test group”. 1
- (b) Explain why the software development company prefers to use such a group. 1
12. *Maintainability* is an important characteristic of software. State **two** characteristics of program code that improve maintainability. 2
13. One type of high level language is a *declarative language*. State **two** features of a declarative language. 2
14. Programmers make use of different types of variables including *Boolean*.
- (a) Describe what is meant by a “Boolean” variable. 1
- (b) Describe, using *pseudocode*, how a Boolean variable would be used. 1
15. A *macro* extends the functionality of a general-purpose package. State **two** methods of creating a macro. 2
16. The string variable **forename** contains “Kathryn” and the variable **surname** contains “Barr”. The variable **username** is assigned the value “KatBar” using the first three characters of each name.



Use a language of your choice to show how substrings and concatenation would be used to assign the value “KatBar” to the variable **username**.

3  
(30)

[END OF SECTION I]

# X206/301

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NATIONAL  
QUALIFICATIONS  
2008

MONDAY, 2 JUNE  
9.00 AM – 11.30 AM

COMPUTING  
HIGHER

Attempt **all** questions in Section I.

Attempt **all** questions in Section II.

Attempt **one** sub-section of Section III.

Part A	Artificial Intelligence	Page 11	Questions 18 to 22
Part B	Computer Networking	Page 15	Questions 23 to 26
Part C	Multimedia Technology	Page 18	Questions 27 to 30

For the sub-section chosen, attempt **all** questions.

Read all questions carefully.

Do not write on the question paper.

Write as neatly as possible.

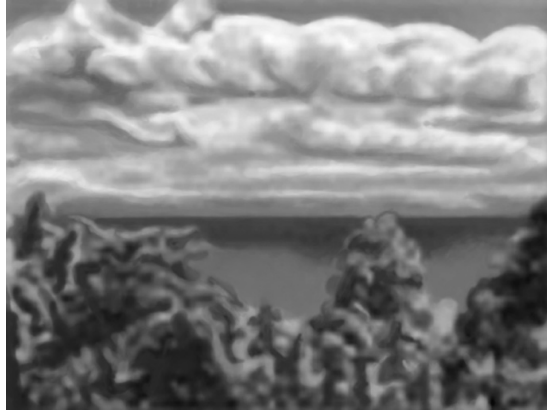


## SECTION I

Attempt all questions in this section.

Marks

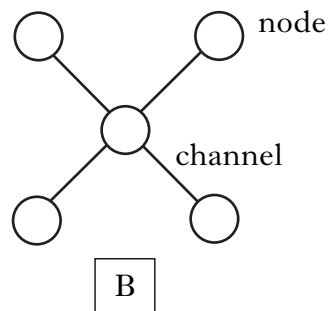
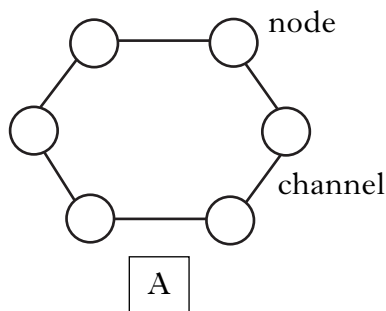
1. Images are stored as *bit-mapped* or *vector* graphics.
- (a) (i) Describe how **bit-mapped** images are stored. 1
- (ii) Describe how **vector** images are stored. 1



- (b) Is the above image bit-mapped or vector? Justify your answer. 2
2. Anti-virus software uses various techniques to detect viruses. One of these techniques is *heuristic detection*.
- (a) Explain how the heuristic detection technique is used to detect a virus. 1
- (b) Explain why a *trojan horse* is **not** classified as a computer virus. 1
3. What is the decimal representation of the 8 bit *two's complement* number 10110110?
- A -182
- B -74
- C -53
- D 182 1
4. (a) The processor has a number of control lines. What is the function of the *reset* line? 1
- (b) Explain why the *address bus* in a computer is unidirectional. 1
5. (a) A *virus checker* and a *disk defragmenter* are *utility programs*. Name **one** other utility program. 1
- (b) Explain how the use of a **disk defragmenter** can improve the system performance of a computer. 2

## SECTION I (continued)

6. Two network topologies are shown below.



- (a) (i) Identify the network topology of Network A. 1
- (ii) Identify the network topology of Network B. 1
- (b) Which of the above topologies would be **least** affected by a channel failure? 1
7. Numbers can be stored within a program as *integer* or *real* variables.  
Explain what is meant by an “integer” variable. 1
8. One task of the evaluation stage of the software development process is to ensure the program meets the *software specification*.  
(a) State **two** other criteria used to evaluate software. 2
- (b) Describe what is meant by the phrase “the software development process is an iterative process”. 1
9. A bank manager uses a *macro* once a month to create an alphabetical list of customers whose account balance is over £5000.  
(a) State **two** benefits of using macros for this type of task. 2
- (b) The macro is written in a high level language. State the **type** of high level language that is used to write macros. 1
10. A program contains the following statement:  
`is_a (rover, dog).`  
State which **type** of programming language is being used. 1

[Turn over

**SECTION I (continued)**

**11.** A holiday booking website includes a currency converter which asks for the amount in pounds sterling and converts it to euros. Here is the top-level algorithm, including data flow for steps 1 and 2.

- |    |                      |  |
|----|----------------------|--|
| 1. | get amount of pounds | (out: <b>pounds</b> )                  |
| 2. | calculate euros      | (in: <b>pounds</b> out: <b>euros</b> ) |
| 3. | display conversion   | .....                                  |

(a) State which *design notation* is being used. **1**

(b) Step 3 results in the following being displayed on screen:

£500 converts to 750 euros.

State the *data flow* for step 3. **2**

(c) Identify whether the **pounds** variable in step 1 should be passed *by value* or passed *by reference*. Explain your answer. **2**

**12.** Explain the purpose of a CASE statement in a high level language. **2**  
**(30)**

[END OF SECTION I]

# X206/301

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NATIONAL  
QUALIFICATIONS  
2009

THURSDAY, 4 JUNE  
9.00 AM – 11.30 AM

COMPUTING  
HIGHER

Attempt **all** questions in Section I.

Attempt **all** questions in Section II.

Attempt **one** sub-section of Section III.

Part A	Artificial Intelligence	Page 11	Questions 24 to 28
Part B	Computer Networking	Page 15	Questions 29 to 32
Part C	Multimedia Technology	Page 19	Questions 33 to 36

For the sub-section chosen, attempt **all** questions.

Read all questions carefully.

Do not write on the question paper.

Write as neatly as possible.





## SECTION I

Marks

Attempt all questions in this section.

1. (a) Write the binary number 1000100111 as a **positive** integer. 1  
(b) Represent the decimal number  $-73$  using 8 bit *two's complement*. 1
  
2. Most modern computers use *Unicode* rather than *ASCII* to represent text.  
State one **advantage** of Unicode when compared to ASCII. 1
  
3. State the number of bits required to represent 16 777 216 colours. 1
  
4. System software consists of the operating system and utility programs.  
(a) A *disk editor* is a common example of utility software. Describe **one** function of a disk editor. 1  
(b) The *bootstrap loader* is part of the operating system. State the purpose of the bootstrap loader. 1
  
5. A *trojan horse* is a malicious computer program. State **one** characteristic of a trojan horse. 1
  
6. Explain why increasing the number of *registers* could improve system performance. 1
  
7. A piece of software has been installed on a computer. A compatibility issue may prevent the new software from running properly on the computer.  
(a) State **one** possible **software** compatibility issue that might prevent the new software from running. 1  
(b) State **one** possible **hardware** compatibility issue that might prevent the new software from running. 1
  
8. A company is advised to change from a *peer-to-peer* network to a *client-server* network.  
(a) Describe **one** difference between a peer-to-peer network and a client-server network. 2  
(b) Describe **one** possible technical reason for choosing a client-server network over a peer-to-peer network. 1

## SECTION I (continued)

9. A graphic file is to be transferred as an e-mail attachment. Explain why a *JPEG* file might be preferred to a *TIFF* file for the graphic in this situation. 2
10. The software development process is described as an *iterative* process.  
Explain how the iterative nature of the software development process is used in the production of software. 2
11. The *software specification* can act as part of the legal contract between the client and the software development company.  
State **two** other purposes of this document. 2
12. A program is being designed which generates a username using the following steps:  
1. get user initial and surname  
2. create username  
3. display the username  
(a) Show how these steps could be represented using a *graphical design notation*. 2  
(b) The username is created by joining the initial to the end of the surname, for example “CarrickE”.  
Name the *string operation* used to create the username. 1
13. Many applications contain scripting languages.  
Explain why there is a need for scripting languages within applications. 1
14. Name **one** type of personnel involved in the *documentation* stage. 1
15. Software can be evaluated in terms of *robustness* and *reliability*.  
(a) Explain what is meant by the term “robustness”. 1  
(b) Explain what is meant by the term “reliability”. 1

[Turn over

**SECTION I (continued)**

16. Software may require adaptive maintenance when a new operating system is installed.  
Describe **one** further example of when adaptive maintenance would be required. **1**
17. A program is created during the implementation stage of the software development process.
- (a) Programmers may make use of a *module library*. State what is meant by the term “module library”. **1**
- (b) The program may require a *user-defined function*. State what is meant by the term “user-defined function”. **2**
- (30)**

[END OF SECTION I]

# X206/301

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NATIONAL  
QUALIFICATIONS  
2010

THURSDAY, 3 JUNE  
9.00 AM – 11.30 AM

COMPUTING  
HIGHER

Attempt **all** questions in Section I.

Attempt **all** questions in Section II.

Attempt **one** sub-section of Section III.

Part A	Artificial Intelligence	Page 10	Questions 18 to 22
Part B	Computer Networking	Page 16	Questions 23 to 26
Part C	Multimedia Technology	Page 20	Questions 27 to 31

For the sub-section chosen, attempt **all** questions.

Read all questions carefully.

Do not write on the question paper.

Write as neatly as possible.



**SECTION I**

**Attempt all questions in this section.**

1. Convert this *8-bit two's complement* binary number into a decimal.  

11010011

**1**
  
2. Jane is concerned about a virus infecting her computer.
  - (a) *Watching* is one *virus code action*. Describe the term “watching”. **2**
  - (b) State **one** other virus code action. **1**
  
3. A *register* can be used to store a *memory address*. State the **two** other types of item that can be stored in a register. **2**
  
4. A new printer has 640 megabytes of RAM installed. State **one** reason why the printer has RAM installed. **1**
  
5. Complete the **two** missing stages of the *fetch-execute cycle*.

1	The memory address of the next instruction is placed on the address bus.
2	
3	The instruction is transferred to the processor on the data bus.
4	

**2**

6. Greg buys a single copy of a popular computer game. He then makes several copies to give out to his friends.
  - (a) State the name of the law that he has broken. **1**
  - (b) State **one** reason why making copies of the game is illegal. **1**
  
7. Explain **one** difference between a *Local Area Network (LAN)* and a *Wide Area Network (WAN)* in terms of *transmission media*. **2**
  
8. Describe **one** reason for connecting a network using a *switch* rather than a *hub*. **2**

## SECTION I (continued)

9. Most high level languages have several *data types* available.

(a) State what is meant by a *real* variable. 1

(b) State the most suitable *data structure* and *data type* for storing the list called “valid” in the pseudocode shown below.

For each member of list

If gender(current) = “M” or gender(current) = “F” Then

Set valid(current) to true

Else

Set valid(current) to false

End If

End fixed loop 2

10. *Design* is the second stage of the software development process.

(a) Explain the importance of the design stage for one of the later stages in the software development process. Your answer should refer to the name of the stage that you have chosen. 2

(b) Describe how *stepwise refinement* can be used to help produce a detailed design. 2

11. Documentation is produced at **each** stage of the software development process.

(a) Name **one** item of documentation that is produced at the *implementation stage*. 1

(b) One purpose of creating documentation at **each** stage is to provide a starting point for the next stage.

State **one** other purpose of documentation. 1

(c) Describe the role that the programmer might play in the production of the *technical guide* during the *documentation* stage. 1

12. Software can be evaluated in terms of *efficiency* and *portability*.

(a) Software can be described as efficient if it does not waste memory.

Describe **one** way of making software efficient in terms of **memory usage**. 2

(b) Describe what is meant by the term “portability”. 2

**SECTION I (continued)**

- 13.** A sports centre has purchased software to assist with daily tasks such as bookings. The new software includes a *scripting language*.

State **one** use of a scripting language.

**1**  
**(30)**

[END OF SECTION I]

# X206/301

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NATIONAL  
QUALIFICATIONS  
2011

FRIDAY, 3 JUNE  
9.00 AM – 11.30 AM

COMPUTING  
HIGHER

Attempt **all** questions in Section I.

Attempt **all** questions in Section II.

Attempt **one** sub-section of Section III.

Part A	Artificial Intelligence	Page 10	Questions 17 to 20
Part B	Computer Networking	Page 14	Questions 21 to 24
Part C	Multimedia Technology	Page 18	Questions 25 to 28

For the sub-section chosen, attempt **all** questions.

Read all questions carefully.

Do not write on the question paper.

Write as neatly as possible.





## SECTION I

**Attempt all questions in this section.**

1. State the largest whole number that can be stored as a 10-bit positive integer. 1
  
2. Name and describe a method for measuring the performance of computers. 2
  
3. Data storage compensates for differences in speed between computers and peripherals. This is achieved through *buffering* and *spooling*.
  - (a) Explain the difference between buffering and spooling. 2
  
  - (b) Compensation for differences in speed between the computer and peripherals is one function of an *interface*. State **two** other functions of an interface. 2
  
4. (a) State the **type** of virus that may affect a computer during the start up process. 1
  - (b) *Replication* and *camouflage* are two *virus code actions*. State **two** other virus code actions. 2
  
5. State **one** advance in computer **hardware** that has led to the increased use of computer networks. 1
  
6. (a) Describe an example in which an image stored as a vector graphic could have a larger file size than if the same image was stored in a bitmapped format. 2
  - (b) A bitmapped graphic has a *bit-depth* of 24 bits and a *resolution* of 300 dpi.
    - (i) State the number of colours that may be represented in this graphic. 1
  
    - (ii) State the effect that increasing the bit-depth will have on the file size of the graphic. 1
  
7. *Analysis* is the first stage of the software development process.
  - (a) Name the document produced at the end of the analysis stage. 1
  
  - (b) Explain why the production of this document could be an *iterative* process. 1

**SECTION I (continued)**

8. *Pseudocode* is a design notation often used during the software development process.
- (a) Pseudocode should include *data flow*. State the purpose of data flow. 1
  - (b) Other than data flow, state **two** benefits to a programmer of a design written in pseudocode. 2
9. State what is meant by the term “boolean variable”. 1
10. Software is usually written using *subprograms*. Two types of subprogram are *procedures* and *functions*.
- (a) State how the use of subprograms increases the *maintainability* of a program. 1
  - (b) Readability of code affects maintainability. Other than using subprograms, state **one** way to improve **readability** of code. 1
  - (c) Explain **one** difference between a procedure and a function. 2

11. A program contains three variables, of **the same type**, with the following values:

variable1	variable2	variable3
8	4	84

The program is written in a new language called SQAM. It contains the line of code shown below. The symbol **?** represents a particular operation.

$$\text{variable3} = \text{variable1} \text{ ? } \text{variable2}$$

- (a) The value 84 is assigned to **variable3**. State the single common operation carried out by the **?** symbol. 1
  - (b) State the *data type* that must have been used for **all three** of the variables. 1
12. A *macro* can be used within application software to automate a task.
- (a) Name the *type* of programming language used to create macros. 1
  - (b) Other than saving time, for example during writing or testing, state **two** further benefits of using macros. 2

**(30)**

# X206/12/01

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NATIONAL  
QUALIFICATIONS  
2012

THURSDAY, 31 MAY  
9.00 AM – 11.30 AM

COMPUTING  
HIGHER

Attempt **all** questions in Section I.

Attempt **all** questions in Section II.

Attempt **one** sub-section of Section III.

Part A	Artificial Intelligence	Page 12	Questions 23 to 27
Part B	Computer Networking	Page 18	Questions 28 to 31
Part C	Multimedia Technology	Page 22	Questions 32 to 35

For the sub-section chosen, attempt **all** questions.

Read all questions carefully.

Do not write on the question paper.

Write as neatly as possible.



**SECTION I**

*Marks*

**Attempt all questions in this section.**

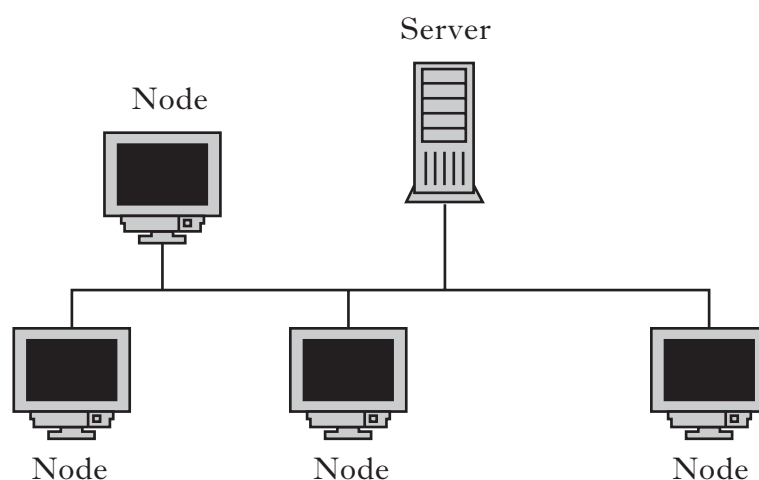
1. Write the ten digit binary number **1001001001** as a positive integer. **1**
  
2. A computer system uses *floating point representation* to store *real* numbers.
  - (a) State the part of floating point representation that determines the **range** of numbers stored. **1**
  
  - (b) State the part of floating point representation that determines the **precision** of numbers stored. **1**
  
3. Ali has created a poster using *bitmapped* graphic software. Describe how a bitmapped graphic is stored. **2**
  
4. *Protocol conversion* and *buffering* are two functions of an interface. State **two** other functions of an interface. **2**
  
5. The table shows types of computer memory listed in **descending** order of *speed of access*, (fastest first). Identify the **two** missing types (1) and (3).

(1)	
(2)	Cache
(3)	
(4)	Backing store

**2**

6. Audrey creates and saves a new document to the hard disk.
  - (a) State **two** tasks carried out by the *file management* part of the operating system during this save operation. **2**
  
  - (b) State **one** task carried out by the *input/output management* part of the operating system during this save operation. **1**

7. The diagram below shows the layout of a small LAN.



- (a) Name this network *topology*. 1
- (b) The network shown above is a *client server* network. State **one** advantage of a client server network over a *peer-to-peer* network. 1
- (c) A device is required to connect this network to the Internet. Name this device. 1
8. The software development process is *iterative*. Explain how the word iterative applies to this process. 2
9. Many software development projects use *top-down design*. Explain the process of top-down design. 1
10. Name **one** *graphical design notation*. 1
11. An *interpreter* may be used in the software development process.
- (a) Name **one** stage of the software development process where the interpreter may be used. 1
- (b) Explain how the interpreter is used in the stage named in part (a). 1
12. Describe **one** difference between a *scripting* language and a *procedural* language. 2

## SECTION I (continued)

13. (a) State what is meant by a *boolean* variable. 1
- (b) Explain how a boolean variable could be used in a *linear search* algorithm. 1
14. Software should be both *reliable* and *robust*. Explain the terms “reliable” and “robust”. 2
15. State **one** way in which documentation produced at the *testing* stage of the software development process will be used during *corrective* maintenance. 1
16. State **two** characteristics of programming code that improve *maintainability*. 2
- (30)

# X206/12/01

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NATIONAL  
QUALIFICATIONS  
2013

TUESDAY, 28 MAY  
9.00 AM – 11.30 AM

COMPUTING  
HIGHER

Attempt **all** questions in Section I.

Attempt **all** questions in Section II.

Attempt **one** sub-section of Section III.

Part A	Artificial Intelligence	Page 12	Questions 23 to 28
Part B	Computer Networking	Page 18	Questions 29 to 31
Part C	Multimedia Technology	Page 24	Questions 32 to 35

For the sub-section chosen, attempt **all** questions.

Read all questions carefully.

Do not write on the question paper.

Write as neatly as possible.

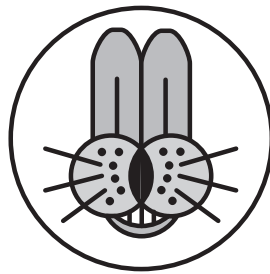


## SECTION I

Marks

Attempt all questions in this section.

1. Characters can be stored using either *Unicode* or *ASCII*. State **one** advantage and **one** disadvantage of using Unicode when compared to ASCII. 2
2. State the **minimum** number of bits needed to represent the range of positive whole numbers from 0 to 16777215. 1
3. The image shown was created using a *bitmapped* graphics package.



Describe how **bitmapped** graphics are stored. 2

4. One possible threat to computers comes from *viruses*.
  - (a) Name the **type** of computer virus that attaches itself to documents created in applications. 1
  - (b) Anti-virus software is often installed when a computer is set up. Describe **one** reason why the computer may still become infected. 1
5. A school office has a networked laser printer.

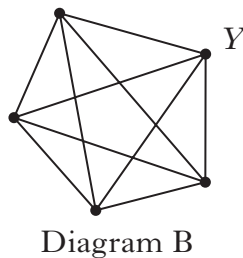
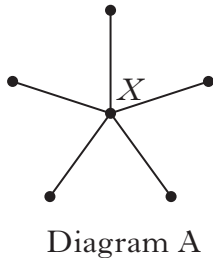
Name and describe a method that could be used to deal with **additional** print jobs when the printer's buffer is full. 2
6. *Read* and *write* are two control lines. Name **two** other control lines. 2



SECTION I (continued)

Marks

7. Two *network topologies* are shown below. Describe the effect **on the network** of the failure of:
- node X in Diagram A
  - node Y in Diagram B.



Key  
 • Node  
 — Channel

2

8. The steps involved in a *write* to memory operation are given below. State the **two** missing steps.

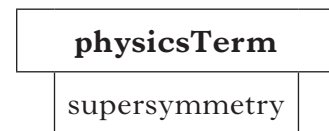
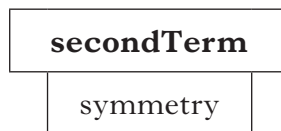
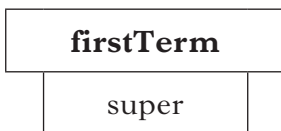
- 1 .....
- 2 Data bus is set up with the data to be written.
- 3 .....
- 4 Data from data bus is placed into specified memory location.

2

9. State why *data flow* should be included in an algorithm.

1

10. The variable **firstTerm** contains “super” and the variable **secondTerm** contains “symmetry”. The variable **physicsTerm** is assigned the value “supersymmetry”. All three are *string* variables.



Using a programming language of your choice, show how *concatenation* is used to assign the value “supersymmetry” to the variable **physicsTerm**.

2

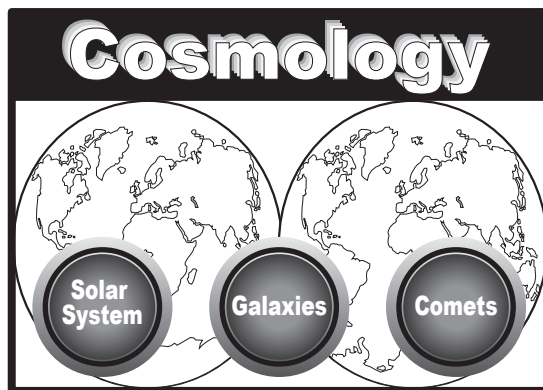
11. In the case of **both** a *local* variable and a *global* variable, explain what is meant by the term *scope*.

2

[Turn over

## SECTION I (continued)

12. Describe **two** characteristics of a *1-D array*. 2
13. State **two** benefits of a *scripting* language. 2
14. State **one** reason why an *independent test group* may be used to test software. 1
15. Describe what is meant when a computer program is described as *portable*. 2
16. The documentation for each subroutine in a *module library* will identify the name of the subroutine. State one **other** item of information that might be included in such documentation. 1
17. The main screen from software containing information about the universe is shown.



The **original specification** for the software required three buttons on the main screen. The client now requires a fourth button called Stars. State the **type** of *maintenance* required. Justify your answer.

2

(30)

[END OF SECTION I]