JUNYUAN SECONDARY SCHOOL
PRELIMINARY EXAMINATION 2018
SECONDARY FOUR EXPRESS

CANDIDATE NAME

CLASS | | | | INDEX NUMBER | |

COMPUTING

7155/01

Paper 1

16 Aug 2018

Candidates answer on the Question Paper.

2 hours

No Additional Materials are required.

READ THESE INSTRUCTIONS FIRST

Write your name, class and index number in the spaces at the top of this page.
Write in dark blue or black pen.
You may use an HB pencil for any diagrams or graphs.
Do not use staples, paper clips, glue or correction fluid.

Approved calculators are allowed.

Answer **all** questions.

The number of marks is given in brackets [ ] at the end of each question or part question.
You should show all your working.
The total number of marks for this paper is **80**.

For Examiner's use

1 Many computer networks use the RING and STAR configurations.

Compare the advantages and disadvantages of both types of networks.

(a) RING Network

Advantage.……..……..……

…….....

…….....

Disadvantage.……..……..……

…….....

……..... [2]

(b) STAR Network

Advantage.……..……..……

…….....

…….....

Disadvantage.……..……..……

…….....

……..... [2]

2 **Five** statements about firewalls are shown.

Tick (✓) to show whether each statement is **true** or **false**.

Statement	True (✓)	False (✓)
Firewalls can monitor incoming and outgoing traffic.		
Firewalls cannot block access to a certain website.		
Firewalls can be software and hardware.		
Firewalls can act as intermediary servers.		
Firewalls can block unauthorised traffic.		

[5]

3 **Four** descriptions about compilers and interpreters are shown below.

Draw lines to indicate which descriptions refer to a compiler and which descriptions refer to an interpreter

Description	
It is more difficult to debug the code since one error can produce many other associated errors.	
The speed of execution of program loops is slower.	Compiler
It produces fast, executable code that runs directly on the processor.	Interpreter
It is easier to debug the code since an error is displayed as soon as it is found.	

[4]

4 **(a)** The following pseudocode was written to input 1000 dates.

```
1 count = 1
2 repeat
3    input day, month, year
4    count = count + 1
5 until count = 1000
```

(i) Describe why the loop only inputs 999 dates instead of 1000.

……

……

…… [1]

(ii) What needs to be changed or added to the above code to make sure 1000 dates are input?

……

……

…… [1]

(b) Errors in code can be found using test data.

Name three different types of test data. Using `month` from the pseudocode above, give an example of each type of test data.

(i) test data type 1 ……

……

example ……

……

(ii) test data type 2 ……

……

example ……

……

(iii) test data type 3 ……

……

example ……

…… [6]

5 This section of pseudocode asks for 80 numbers between 100 and 1000 to be entered. It checks that the numbers are in the correct range, and stores them in a list. It counts how many of the numbers are larger than 500 and then outputs the result when the program is finished.

```
1   Count = 0
2   FOR Index = 1 TO 80
3      INPUT 'Enter a number between 100 and 1000', Number
4      WHILE Number = 99 AND Number = 1001
5         INPUT 'This is incorrect, please try again', Number
6      ENDWHILE
7      Num[80] = Number
8      IF Number > 500 THEN Count = Count + 1
9   UNTIL Index = 80
10  PRINT Index
11  PRINT ' numbers were larger than 500'
```

There are **four** lines of code that contain errors.

State the line number for each error and write the correct code for that line.

Error 1 Line number .....

Correct code .....

Error 2 Line number .....

Correct code .....

Error 3 Line number .....

Correct code .....

Error 4 Line number ….....

Correct code .....

[4]

6 **(a)** Complete the paragraphs choosing the correct five terms from the list. Each term can only be used once:

- Ethics
- Freeware
- Free and Open-Source Software
- Hacking
- Malware
- Plagiarism
- Shareware
- Virus

Taking another person's work from the Internet and claiming it as your own is called.....(i)..... It is possible to protect your work online with copyright. One product that people may want to protect is software. .....(ii)..... does allow a person to share, copy and change software freely, but .....(iii)..... does not allow a person to do this legally. Software that has a licence allowing free use for a trial period is called .....(iv)..... . The name given to this area of Computing is .....(v)..... .

(i) ……..……..

(ii) ……..……..

(iii) ……..……..

(iv) ……..……..

(v) ……..…….. [5]

(b) The following URL is typed in:

http://www.junyuansec.moe.edu.sg/ComputingPapers

This URL is composed of three parts.

State the part of this URL that is the:

File name .....

Protocol .....

Web server name ..... [3]

(c) 1A – 16 – C5 – 22 – FF – FF is an example of a MAC address.

Identify what the first six and last six hexadecimal digits represent.

(i) First six digits .....

.....

.....

(ii) Last six digits .....

.....

.....[2]

7 A computer system is to have access to the Internet.

Name and describe **three** potential security issues.

Security issue 1 ……

Description ……..……..……..……..……..

……..……..……..……..……..

……..……..……..……..……..

Security issue 2 ……..……..……..……

Description ……..……..……..

……..……..……..……..

……..……..……..……..

Security issue 3 ……..……..……..……

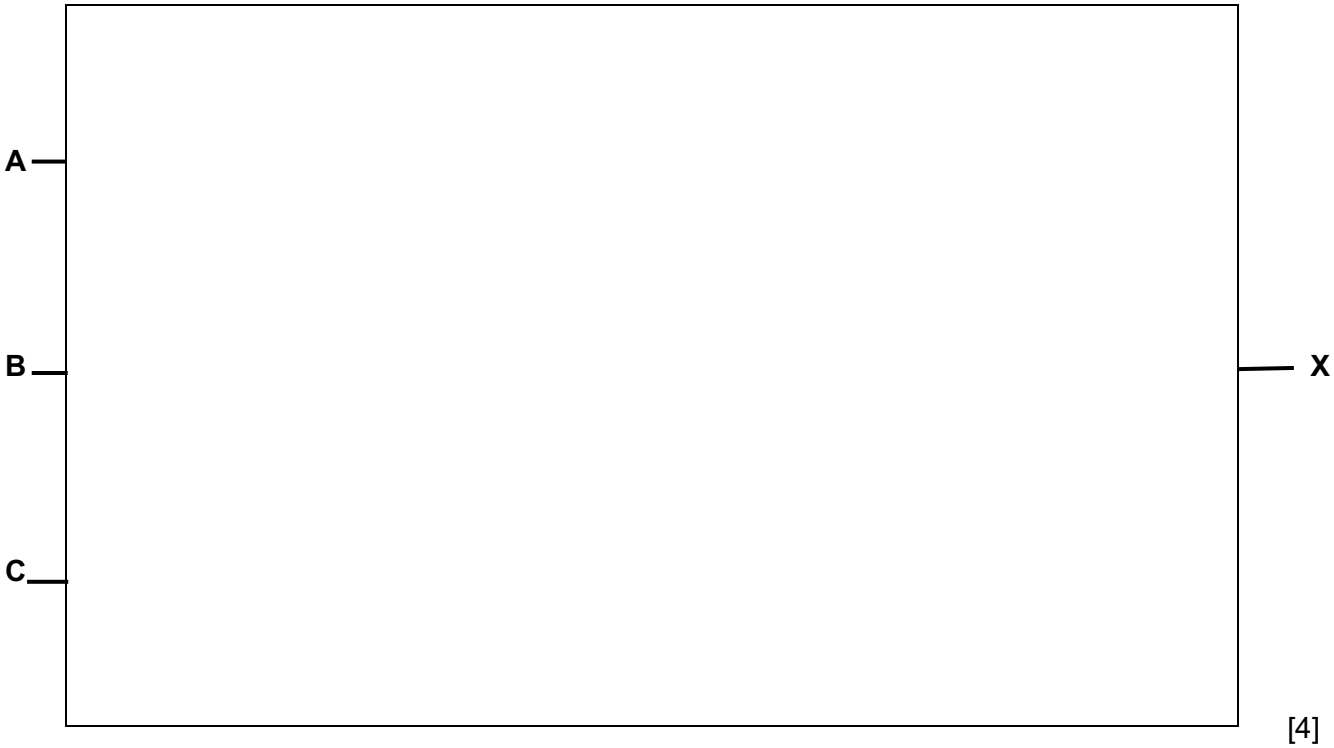
Description ……..……..……..

……..……..……..……..

…… [6]

8 **(a)** Draw the logic circuit for the following logic statement:

X = (**A** NOR **B**) OR (NOT **C** AND **B**)



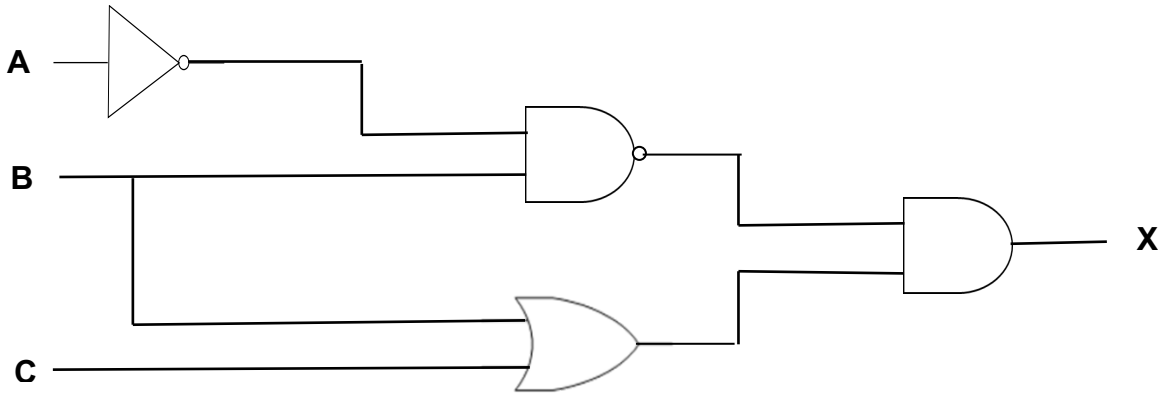
[4]

(b) Complete the following truth table for the logic statement in **part (a)**.

Input			Working space	Output
A	**B**	**C**		**X**
0	0	0		
0	0	1		
0	1	0		
0	1	1		
1	0	0		
1	0	1		
1	1	0		
1	1	1		

[4]

(c) Write a logic statement that describes the following logic circuit:



X = ……

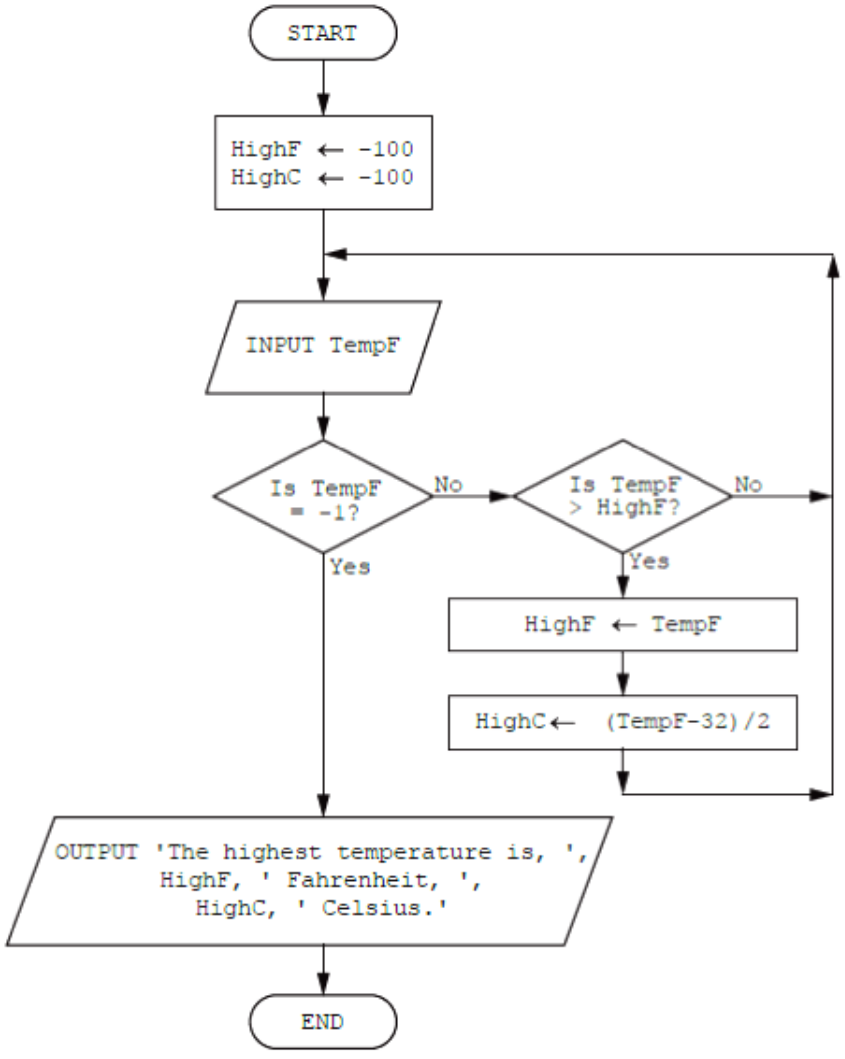
…… [3]

9 This flowchart inputs a range of temperatures in degrees Fahrenheit.

As each temperature is input, it is compared with the previous highest temperature. If it is higher than the current highest, it replaces the previous highest temperature and then it is converted to degrees Celsius.

For ease of calculation, the final step of the Fahrenheit to Celsius conversion has been approximated as division by 2.

When –1 is entered, the input process stops and the highest temperature (in both Fahrenheit and Celsius) is output.



Complete the trace table for the input data:

68, 46, 50, 86, 65, 50, 40, 30, –1

HighF	HighC	TempF	OUTPUT

[5]

10 **(a)** When eight bytes of data have been collected, they are transmitted to a computer 100 km away. Parity checks are carried out to identify if the data has been transmitted correctly.

The system uses **even parity** and column 1 is the parity bit.
The eight bytes of data are sent together with a ninth parity byte:

	parity bit	column 2	column 3	column 4	column 5	column 6	column 7	column 8
byte 1	1	0	0	0	0	1	0	0
byte 2	1	1	1	1	0	0	1	1
byte 3	0	1	0	0	1	0	0	0
byte 4	0	1	1	1	0	0	0	1
byte 5	1	0	0	0	1	1	1	1
byte 6	0	0	0	0	0	0	0	0
byte 7	1	1	1	0	1	0	0	0
byte 8	1	0	0	0	1	1	1	0
parity byte	1	0	1	1	0	1	1	1

(i) Identify which of the eight bytes contains an error.

byte ..... [1]

(ii) Identify which column contains an error.

column ..... [1]

(iii) The incorrect bit is indicated where the byte number and column cross.

Give the corrected byte.

[1]

(iv) Calculate the denary value of the corrected byte.

.....

..... [1]

(b) There are other methods used to detect errors that can occur during data transmission and storage.

Describe each of the following error detection methods.

Check digit ……

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……

……

……

Checksum..……

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……

…… [4]

11 **(a)** A manufacturer of aeroplane engines assigns a denary identification number (ID) to each engine.

One engine has the ID: **0431**

(i) Convert this denary number to a 12-bit binary format.

[2]

(ii) Show how this number would be represented in hexadecimal.

.....

..... [3]

(b) The current status of the engine is sent to a computer in the aeroplane.

Each piece of data collected is 8 bytes in size. Data collection occurs every 30 seconds.

Calculate the number of kilobytes that would be needed to store the data collected during a 10-hour flight. Show your working.

.....

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.....

.....

.....kilobytes [2]

(c) At the end of the flight, all of the data are sent to the aeroplane engine manufacturer using the Internet.
The computer in the aeroplane has a MAC address and an IP address.
State what is meant by these two terms.

MAC address .....

.....

.....

IP address .....

.....

..... [2]

12 A customer wants to compare prices of 1000 items sold in two supermarkets (price1 and price2).

Write an algorithm, using only pseudocode **or** a program flowchart, which:

- inputs the two prices for all 1000 items
- outputs how many items were more expensive in supermarket 1
- outputs how many items were more expensive in supermarket 2
- outputs the largest price difference

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[6]

End of Paper