



Anglo-Chinese School  
(Barker Road)

**PRELIMINARY EXAMINATION 2019**

**SECONDARY FOUR  
EXPRESS**

**COMPUTING  
PAPER 1**

**7155/01**

**Marking Scheme**

- 1 (a) Convert 32 KB into bytes.

$$32 \times 10^3 = 32000$$

[1]

- (b) Convert 3 MiB into bytes.

$$3 \times 1024^2 = 3\,145\,728$$

[1]

- 2 Draw a line to match the role to its correct description.

Roles		Description
arithmetic logic unit	•	Stores data, instructions and the result of processing for immediate use <b>memory</b>
address bus	•	Transports required memory location from processor to memory; uni-directional <b>address bus</b>
data bus	•	Intermediate or final results produced by the computer; usually in the form of processed data <b>output</b>
control unit	•	Part of the processor that processes data by performing basic mathematical and logical operations <b>arithmetic logic unit</b>
memory	•	
output	•	

[4]

- 3 Insert **four** of the following phrases in the correct space below.

Metropolitan Area Network

Internet protocol

Router

Wide Area Network

Service Set Identifiers

Network Interface Card

- (a) **Network interface card** provides the hardware interface to enable the transfer of data between a device and a network.
- (b) **Service Set Identifiers** is a 32-byte string that indicates a wireless access point (WAP) and all devices connected to it.
- (c) **Router** allows separate networks that use different network protocols to be connected together
- (d) **Metropolitan Area Network**..: Network of computing devices typically spanning across two or more buildings within the same town or city.

[4]

- 4 Your company is setting up a new office and you as the manager of the new office need to decide to install wireless or wired network.

Give **one** advantage and **one** disadvantage of a wireless network as compared to a wired network.

Advantage

- For wireless network, mobility of users is higher as users can move about freely within the range of the wireless network. For wired networks, mobility of users is lower as network connections are fixed at specific spots and users cannot move to other locations.
- For wireless network, adding new devices to the network is easier as the router can be easily configured. For wired networks, it is more cumbersome to add new devices to the network as physical constraints and the running of cables need to be considered.
- Wireless networks are more organised without cables. Wired networks tend to look more disorganised due to cables running across floors.

[4]

Disadvantage

- For wireless networks, cost is higher as wireless networking equipment is more expensive. For wired networks, cost is lower as equipment and cables are cheaper.
- For wireless networks, transfer rate is generally slower and has lower bandwidth due to possible interference from radio waves or microwaves; varies according to user location in relation to network. For wired network, transfer rate is faster and has higher bandwidth as cables provide dedicated connection.
- Wireless networks are less reliable due to potential interference from radio waves and microwaves or blockage from physical obstructions. Wired networks are more reliable as data transmission is unaffected by interference.
- Wireless networks are less secure due to possible intrusion by hackers. Wired networks are more secure as the network is less susceptible to interception and hacking.

- 5 The use of technology has impact our lives in many areas.  
Describe **two** advantages and **two** disadvantages of the impact of technology on healthcare.

Advantages

- Video conferencing gives patients who are located in remote places or have limited mobility better access to healthcare.
- Allow patients to securely transfer potentially sensitive medical information.
- Use of robots to dispense medicine and other more menial tasks.
- The rise of 3D-printing technology has also opened up new opportunities in the building and customisation of prosthetic limbs, hearing aids and dental fixtures.

Disadvantage

- Some patients find the use of robots and other technology in healthcare impersonal and mistrust the ability of machines to provide proper healthcare.
- Other patients may misuse information from the Internet and make potentially dangerous decisions based on incorrect diagnoses

Disavantage 2 .....  
.....  
..... [4]

- 6 It is an increasing trend in online transactions such as i-banking and e-shopping. This has led to an increase in pharming.

(a) Describe what pharming is and how it works.

- The interception of requests sent from a computer to a legitimate website and redirection to a fake website
- to steal personal data or credit card details

[2]

(b) One way to avoid being pharmed is to ensure that public key encryption is used when submitting credit card or other sensitive information via the Internet. Explain how public key encryption works.

- Encoded messages that can only be read by the intended recipient with a private key.
- Look for the "https://" and a padlock icon appears next to its address on a web browser.

[2]

(c) Suggest another way to avoid being pharmed.

Any one from the following:

- Regularly check bank, debit/credit card and other statements
- Regularly update web browsers and software
- Make sure that two-factor authentication is enabled for all bank transactions.

[2]

- 7 Name **two** types of external storage that are commonly found in a computer system, list their corresponding example **and** describe each of them in terms of their advantage and disadvantage.

Type: Magnetic

Example: hard disk

Description: They have large storage capacity (Terabytes). However, they are vulnerable to drops and mechanical shocks.

Type: Optical

Example: Digital Versatile Disc (DVD)

Description: They have large storage capacity (Gigabytes). However, they are vulnerable to scratches and fingerprints.

Type: Solid State

Example: memory cards

Description: They are much faster than magnetic or optical external storage.

They are not as vulnerable to drops, mechanical shocks, scratches or fingerprints. They are smaller in size and lighter in weight, and use very little power and produces no noise. However, they are much more expensive than magnetic or optical external storage

8 Study the Boolean statement:

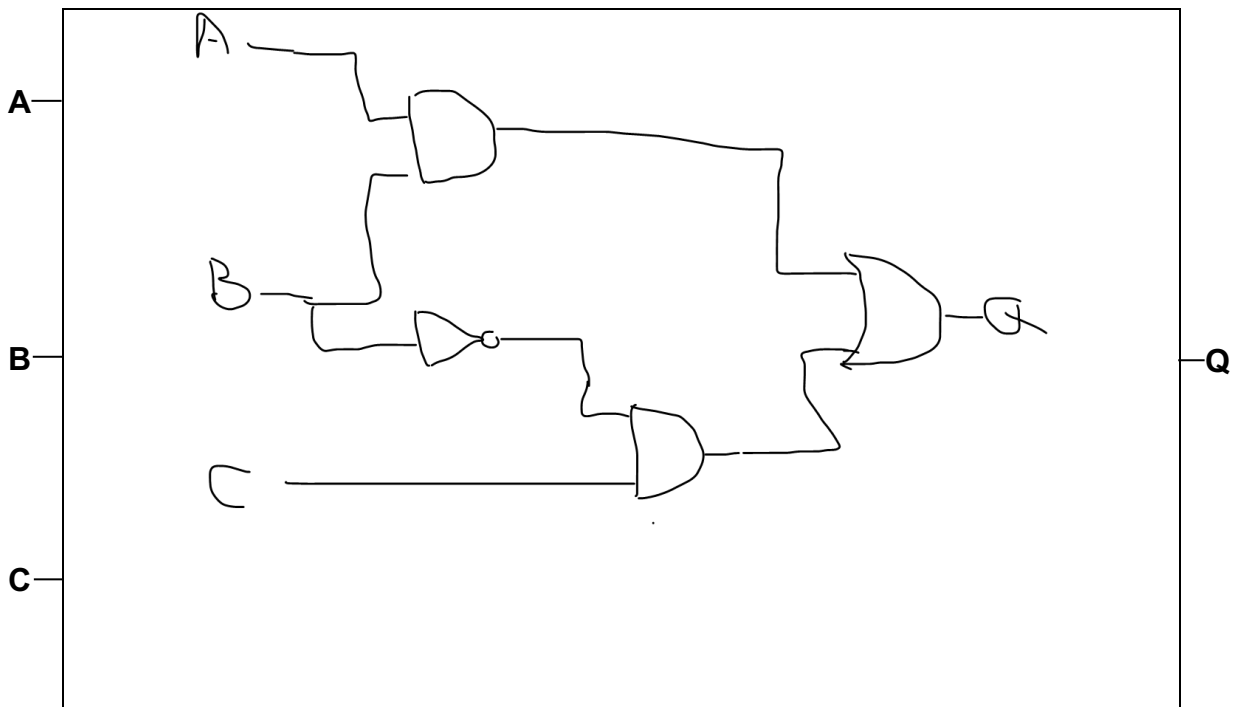
$$Q = 1 \text{ if } (A = 1 \text{ AND } B = 1) \text{ OR } ((B = \text{NOT } 1) \text{ AND } C = 1)$$

(a) Complete the truth table for the Boolean statement above.

Working space							
A	B	C	D=A and B	E=not B	F=E and C	Q=D or F	
0	0	0	0	1	0	0	[1 mark]
0	0	1	0	1	1	1	
0	1	0	0	0	0	0	
0	1	1	0	0	0	0	
1	0	0	0	1	0	0	[1 mark]
1	0	1	0	1	1	1	
1	1	0	1	0	0	1	
1	1	1	1	0	0	1	
1	1	0					
1	1	1					

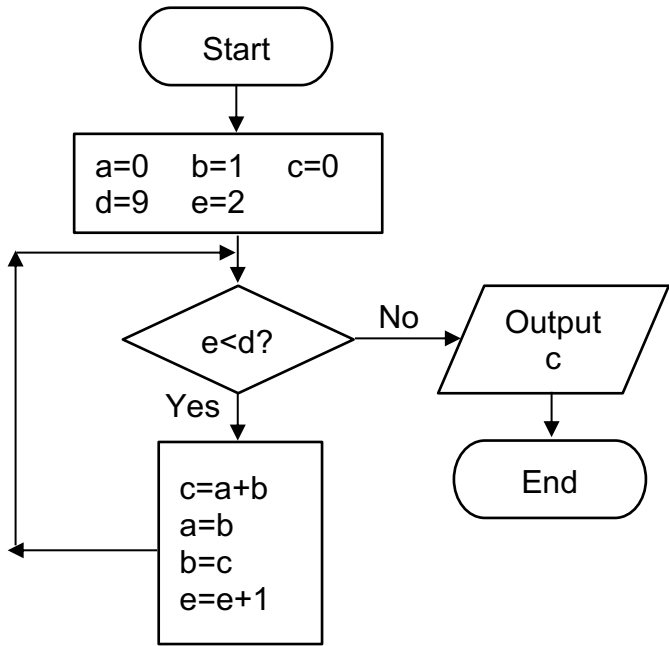
[2]

(b) Draw a logic circuit for the Boolean statement above.



[4]

9 Study the flowchart below.



Complete the trace table for the flowchart.

Trace table

a	b	c	d	e	output
0	1	0	9	2	
1	1	1		3	
1	2	2		4	
2	3	3		5	
3	5	5		6	
5	8	8		7	
8	13	13		8	
13	21	21		9	
					21
[1 mark]	[1 mark]	[1 mark]	[1 mark]	[1 mark]	[1 mark]

[6]

10 The spreadsheet below shows the information of a shopping list.

	A	B	C	D	E
1	Happy Grocery Shop				
2					
3		item	Unit Price	Quantity	Total
4	1	Toothbrush	\$3.90	5	\$19.50
5	2	Detergen	\$8.90	2	\$17.80
6	3	Toilet rolls	\$2.10	2	\$4.20
7	4	Shampoo	\$19.90	1	\$19.90
8	5	Body milk	\$15.90	1	\$15.90
9				Sub-total	\$77.30
10				GST	\$5.41
11				Grand total	

Answers:

- a) 11 rows and 5 columns
- b) A1:E1
- c) C6\*D6
- d) E9+E10
- e) E5, E9, E10 and E11
- f) IF(E11>=80, "Yes", "No")

(a) The spreadsheet above contains ..... rows and ..... columns. [1]

(b) Write down the range of cells that has been merged.

..... [1]

(c) A formula =C4\*D4 is entered in cell E4 to calculate the total price for five toothbrush. The formula is copied to complete column E.

Write down the formula in cell E6.

..... [1]

(d) Write down the formula in cell E11 to calculate the Grand Total.

..... [1]

(e) When the value in cell D5 is changed, list the cell(s) that will change as a result of this.

..... [1]

(f) Customers who spent a grand total of \$80 and above can qualify for a lucky draw. Write down a function in cell B11 to display Yes if the customer is qualified, display No if he is no.

..... [1]



- 11 The program below will take in three positive integer values. They are the length of the three sides of a triangle. The program will output whether the triangle is a right-angled triangle.

```
1 side = int(input("Enter the length for side 1:"))
2 side2 = int(input("Enter the length for side 2:"))
3 side3 = int(input("Enter the length for side 3:"))
4 side1sq = side1*side1
5 side2sq = side2*side2
6 side3sq = side3Xside3
7 if side1sq+side2sq==side3sq:
8     valid = 1
9 elif side1sq+side3sq==side2sq:
10    valid = 1
11 elif side2sq+side3sq==side1sq:
12    valid = 1
13 else:
14    valid=1
15 if valid = 1:
16    print("This is a right-angled triangle")
17 else:
18    print("This is NOT a right-angled triangle")
```

There are four errors in this Python code. Locate the errors and state the correct code.

Error: (line1) `side = int(input("Enter the length for side 1:"))`  
Correction: `side1 = int(input("Enter the length for side 1:"))`

Error: (line 6) `side3sq = side3Xside3`  
Correction: `side3sq = side3*side3`

Error: (line 14) `valid=1`  
Correction: `valid = 0`

Error: (line 15) `valid = 1`  
Correction: `valid == 1`

Correction: .....

Error 4: .....

Correction: .....

[8]

- 12 (a) Convert the binary number **111001** into denary number. Show your working.

**57**

$$(1 \times 2^5) + (1 \times 2^4) + (1 \times 2^3) + (0 \times 2^2) + (0 \times 2^1) + (1 \times 2^0)$$

$$= 32 + 16 + 8 + 0 + 0 + 1$$

$$= 57$$

[2]

- (b) Convert the denary number **108** into hexadecimal number. Show your working.

**6C**

16 | 108

6

Remainder - 12

**C**

Remainder - 6

**6**

[2]

- (c) Convert the hexadecimal number **13A** into a 10-digit binary number. Show your working.

**01 0011 1010**

Hexadecimal	Binary
0	0000
1	0001
2	0010
3	0011
4	0100
5	0101
6	0110
7	0111

Hexadecimal	Binary
8	1000
9	1001
A	1010
B	1011
C	1100
D	1101
E	1110
F	1111

[2]

- (d) A computer requires IP and MAC address for online shopping. State what MAC represent and how is it represented in number systems?

**MAC = Media Access Control**

Function: identify a particular network interface card

**6 bytes binary numbers - 6 groups of 2-digits hexadecimal numbers**

E.g. 20:17:0B:AD:C0:DE

[2]

**IP = Internet Protocol**

Function: a standard system of rules used by computers on the Internet to communicate with one another.

**IPv4 – 4 bytes binary numbers**

**IPv6 – 16 bytes binary numbers – 8 groups of 4-digits hexadecimal numbers**

E.g. 20:17:0B:AD:C0:DE

13 A teacher wants to calculate L1R5 aggregate scores for her students according to their names. There are 30 students in her class.

(a) State the inputs, the outputs and the processes required to calculate the L1R5 aggregate scores.

<b>Inputs:</b> <ul style="list-style-type: none"> <li>30 students' names</li> <li>30 students' marks for 6 subjects (Accept: 30 students' grades for 6 subjects)</li> </ul>	.....
	.....
	.....
<b>Output:</b>	.....
<ul style="list-style-type: none"> <li>L1R5 aggregate scores for 30 students</li> </ul>	.....
	.....
<b>Processes:</b>	.....
<ul style="list-style-type: none"> <li>Find the grade for the 6 best subjects for each student</li> <li>Store the L1R5 aggregate scores according to the names in a list</li> </ul>	.....
	.....

..... [5]

(b) When the problem is complex, we can solve the problem by decomposing it into smaller and manageable parts. Name **one** of the common approaches to decompose a problem.

Incremental or modular	..... [1]
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(c) Name **and** describe **one** validation check that could be added to validate the input.

Range check – the scores must be $\geq 0$ and $\leq 100$	.....
Length check – must have 30 inputs	.....
Format check – scores must be numeric values	.....

..... [2]

(d) Identify **one** test case condition that could be used to test the algorithm mentioned above. Give an example of test data for this algorithm.

Normal condition – 88	.....
Boundary condition – 100	.....
Error condition - 105	.....

..... [2]

**14** Write an algorithm, using only pseudo-code or a program flowchart, that:

- Inputs twenty numbers and stores these numbers in a list
- Output the list index of any number divisible by 5
- Output how many numbers were divisible by 5

<pre>Initialise a list numList Initialise a counter total5 = 0 for count = 1 to 20     input number     store the number in numList     if number%5==0         total5 = total5 + 1     output count output total5,count</pre>	<pre>1 mark - initialisation for counter and list 1 mark – loop for 20 times 1 mark – input a number and store in a list  1 mark – to check if the number is divisible by 5 1 mark – update the counter 1 mark – output for the list index and how many numbers</pre>
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[6]

## End of Paper