ZHONGHUA SECONDARY SCHOOL

PRELIMINARY EXAMINATION 2020
SECONDARY 4 EXPRESS

Candidate's Name	Class	Register Number
MODEL ANSWER TOS		

COMPUTING

7155/01

Paper 1

18 September 2020
2 hours

Additional Materials: NIL

READ THESE INSTRUCTIONS FIRST

Write your index number and name on all the work you hand in.
Write in dark blue or black pen on both sides of the paper.
You may use a pencil for any diagrams or graphs.
Do not use staples, paper clips, glue or correction fluid.

Answer **all** the questions.
Write your answers in this question booklet.
Give non-exact numerical answers correct to 3 significant figures, or 1 decimal place in the case of angles in degrees, unless a different level of accuracy is specified in the question.
The use of a scientific calculator is expected, where appropriate.
You are reminded of the need for clear presentation in your answers.

At the end of the presentation, fasten all your work securely together.
The number of marks is given in brackets [ ] at the end of each question or part question.

The total number of marks for this paper is **80**.

For Examiner's Use:

Setter: Mr. Calvin Heng
Vetter: Mr. Low Kee Ley

1 **(a)** Convert 8 bits into GB.

8 bits = 1 byte

1byte x 10^{-3} x 10^{-3} x 10^{-3} = $\underline{1.00 \times 10^{-9}\ \text{GB (3sf)}}$

KB MB GB

[1]

(b) Convert 64 Terabytes into KB.

64 x 10^{3} x 10^{3} x 10^{3} = 64 x 10^{9} = $\underline{6.40 \times 10^{10}\ \text{KB (3sf)}}$

GB MB KB

[1]

2 Draw a line to match the terms to its correct description.

Terms	Description
DoS Attack	
Cookie	A small piece of data used by websites to store personal information on a user's web browser.
Encryption	Hidden program that secretly collects personal information.
Phishing	Flooding network with useless traffic, making the network slow or inaccessible.
Software piracy	Sending fake or spoof emails.
Spyware	

[4]

3 Fill in the blanks with the helping words.

ALU	*APPLICATION*	*RAM*
CPU	*ROM*	*UTILITY*

(a) **RAM** is high speed, volatile memory.

(b) The accumulator stores intermediate results of calculations in the **ALU**.

(c) Antivirus software is an example of **UTILITY** a software.

(d) **ROM** tells the CPU how to boot up.

[4]

4 Fiona is a graphic designer for a publishing company. The image editing software that she uses represents each unique colour as a six digit hexadecimal code.

(a) As a power of 16, how many possible unique colours could Fiona use? (workings must be shown clearly)

6 digits of 16 possibilities:
= 16 x 16 x 16 x 16 x 16 x 16
= 16,777,216 colours

[2]

(b) Explain **one** benefit to programmers of using hex codes to represent the different colours.

It would be easier to remember the hexadecimal code for a particular colour BECAUSE

Hexadecimal codes are shorter and more convenient to handle than the binary equivalent.

[2]

5	The use of technology has impacted our lives in many areas. Describe **two** advantages and **two** disadvantages of the impact of technology on <u>healthcare</u>.	
	Advantage 1	
	Telemedicine – use of video conferencing and other technology for doctors to provide medical consultations and diagnoses over the internet.	
	Advantage 2	
	Use of robots to dispense medicine and performance of other menial tasks.	
	Disadvantage 1	
	Misuse of medical information from the internet leading to potentially dangerous decisions based on incorrect diagnoses.	
	Disadvantage 2	
	Some people find the use of robots and other technology impersonal and distrust the ability of machines to provide proper healthcare.	
		[4]

6	Access to a computer system is becoming more sophisticated. One area of major development is in user authentication.			
	(a)	Describe what is authentication and how it works?		
	It is the process of verifying the identity of a user. It requires the user to prove his identity by providing evidence from categories such as a password; or use of a mobile phone; and or smart phone or body part (e.g. face).			
				[2]
	(b)	One way to conduct authentication is to use two-factor authentication. Explain how two-factor authentication works using a one-time-password (OTP) on the users' mobile phone.		
	To access the computer system, the user has to confirm his identity by providing a secret password. The system generates a one-time password (OTP) and sends it to the user on his mobile phone. The user then enters this OTP to gain access.			
				[2]
	(c)	Suggest another way to implement two-factor authentication.		
	Using a security token (hardware device that has a small screen and a few buttons, issued by the website/business concern. The security token generates the OTP and the user enters this OTP to gain access.			
				[2]

7	Besides optical technology storage devices, name **two** other types of external storage technologies found in a computer system. List their corresponding example **and** describe each of them in terms of their advantage and disadvantage.	
	Type 1 : **MAGNETIC STORAGE**	
	Example: **HARD DISKS**	
	Description	
	Advantage: Cheap, Reliable, Huge Capacity, Easy to transport. Disadvantage: Heavy. Takes up space. Sensitive to heat, vibration. **{Any 1 Advantage and 1 Disadvantage}**	
		[3]
	Type 2 : **SOLID STATE DEVICE**	
	Example: **THUMB DRIVE**	
	Description:	
	Advantage: Small form factor – Easy to transport, Very large storage capacities (hundreds of gigabytes) Disadvantage: Expensive, Delicate, Easily misplaced due to small size. **{Any 1 Advantage and 1 Disadvantage}**	
		[3]

8 Study the Boolean statement:

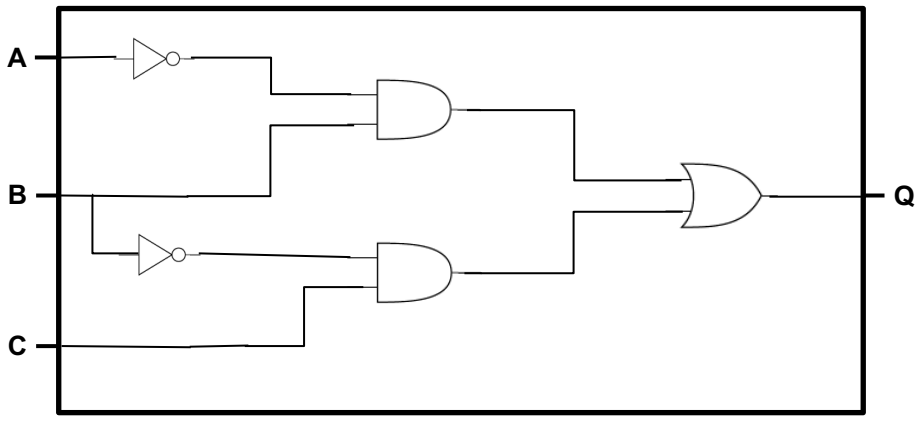
Q = (NOT **A** AND **B**) OR (NOT **B** and C)

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

A	B	C	NOT A	NOT A * B	NOT B	NOT B * C	Q
0	0	0	1	0	1	0	0
0	0	1	1	0	1	1	1
0	1	0	1	1	0	0	1
0	1	1	1	1	0	0	1
1	0	0	0	0	1	0	0
1	0	1	0	0	1	1	1
1	1	0	0	0	0	0	0
1	1	1	0	0	0	0	0

[2]

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



[4]

9 Dr Heng records a patient's temperature once an hour for six hours. Any time the temperature is > 37C, an incidence of fever is recorded. The average of all temperatures taken is calculated at the end.

(a) Before you complete the trace table, calculate the average temperature (to one decimal place) using the following test data:

36, 36, 38.5, 37, 38, 36

Expected result = **36.9**

(b) Complete the trace table using the temperatures above.

```
Line  Pseudocode
010   temp ← 0
020   fever ← 0
030   total ← 0
040   hour ← 1
050   WHILE hour < 7
060       OUTPUT "Enter Temp: "
070       temp ← USERINPUT
080       IF temp > 37 THEN
090           fever ← fever + 1
100       END IF
110       total = total + temp
120       hour = hour + 1
130   ENDWHILE
140   average ← ROUND(total/hour, 1)  # round to 1 decimal place
150   OUTPUT "Average Temp: ", average
160   OUTPUT "Fever Incidents: ", fever
```

temp	fever	total	hour	average	OUTPUT
0	0	0	1		
					Enter Temp:
36		36	2		
					Enter Temp:
36		72	3		
					Enter Temp:
38.5	1	110.5	4		
					Enter Temp:
37		147.5	5		
					Enter Temp:
38	2	185.5	6		
					Enter Temp:
36		221.5	7		
				31.6	
					Average Temp: 31.6
					Fever incidents: 2

Grade by columns. Deduct 1 mark for each incorrect column. [5]

(c) Is the algorithm correct? If not, write your change to the pseudo-code below so that it gives the correct results.

NO. Line 040 change to ***hour ← 0 and while hour < 6***
Line 140 average <- round(total/(hour-1), 1) [1]

	{state position and code change}	

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

	A	B	C	D	E	F
1	GIGI PHARMACY SERVICES PTE LTD					
2						
3	**S/No**	**Item**	**Unit Price**	**Quantity**	**Qty Disc**	**Total**
4	01	Face Mask	$20.50	50	10	$922.50
5	02	Tooth Paste	$8.30	2	0	$16.60
6	03	Mouth Wash	$3.90	3	0	$11.70
7	04	Dental Floss	$4.50	4	5	$17.10
8	05	Liquid Soap	$11.30	20	10	$203.40
9	06	Hand Sanitizer	$18.40	3	0	$55.20
10					*Sub-total*	########
11					*GST*	$85.86
12					*Grand Total*	
13						
14	**Quantity Discount Table**					
15	Quantity	Discount %				
16	2	0				
17	4	5				
18	8	10				

(a) The spreadsheet above contains: **18** rows and **6** columns. [1]

(b) The most likely function used in cell **E4** is:

VLOOKUP [1]

Do NOT accept answer using "if" statement!

(c) A formula **=(C4*D4)*(1-E4/100)** is entered into cell F4 to calculate the total price for 6 packs of toilet rolls. The formula is copied to complete column F.

Write down the formula in cell F7:

= (C7 * D7) * (1 - E7/100) [1]

(d) GST is charged at 7% of the Sub-Total. Write down the formula in cell F11:

= 0.07 * F10 [1]

(e) Why does the cell F10 show "**########**"?

The width of cell F10 is insufficient to display the number. [1]

(f) Customers who spend a sub-total of $1,000 and above qualify for a lucky draw. Write down the function in cell **B12** to display "*" if the customer qualifies or "-" otherwise.

= IF(F10 >= 1000, "*", "-") [1]

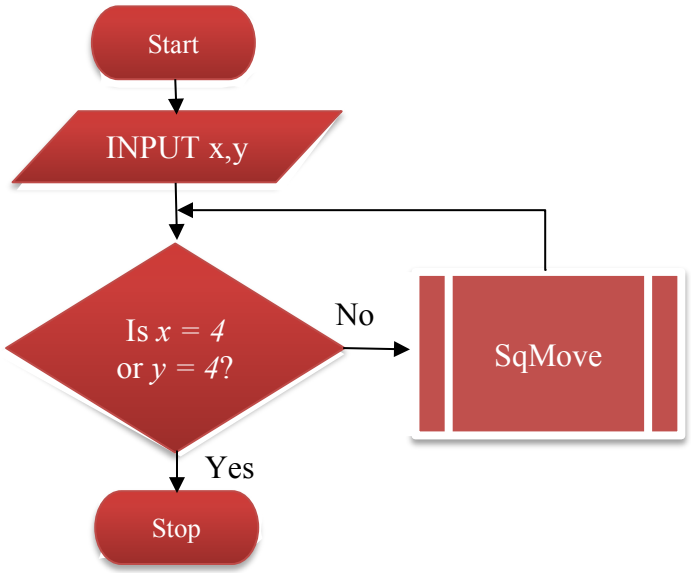
11	Question Text	
	There are three errors in the Python code. Locate the errors and state the correct code.	
	Line **Code**	
	100 alive == True	
	110 If hunger == 0 or hydration == 0 or comfort == 0:	
	120 alive = False	
	130 elif (hunger < 20 and hydration < 20) or (hunger < 20 and	
	140 comfort < 20) and (hydration < 20 or comfort < 20):	
	150 alive = False	
	160 elif hunger < 40 or hydration < 40 or comfort < 40:	
	170 alive = False	
	180 else:	
	190 alive = True	
	Note: Line 140 continues from Line 130	
(a)	**Error 1: _Line 100_**	
	Correction 1: _alive = True_	
(b)	**Error 2: _Line 140_**	
	Correction 2: _comfort < 20) or (hydration < 20 and comfort < 20):_	
(c)	**Error 3: _Line 160_**	
	Correction 3: _elif hunger < 40 and hydration < 40 and comfort < 40:_	
		[6]
(d)	The variable alive is of type **BOOLEAN**.	[1]
(e)	State another Boolean operator besides the two used in this program: **NOT**	[1]

12	**(a)**	Convert the hexadecimal number 87 into a denary number. Working must be shown.	
		87 = 8 x 16^1 + 7 x 16^0 = 8 x 16 + 7 x 1 = 128 + 7 = **135**	[2]
	(b)	Convert the denary number 79 into an 8-bit binary number. Working must be shown.	
		Ladder Division as working 79_{10} = **01001111_2**	[2]
	(c)	Convert the hexadecimal number 8C into a binary number. Working must be shown.	
		Hexadecimal to Binary conversion Table: 8 = 1000_2 ; C = 1100_2 Combine into: 10001100 → **10001100_2**	[2]
	(d)	The function denary() converts one hexadecimal character to denary. (e.g. denary(F) = 15). Calculate the value of denary(A) + denary(C).	
		denary(A) = 10 denary(C) = 12 hence denary(A) + denary(C) = 10 + 12 = 22.	[2]

13	Question Text	
	Complete the following table of variables to be used: **Variables used** | **Remarks** username | To store the username. Characters. password | To store the password. Characters. Length_password | Length of Password. Constant. Set to 6. |	[4]
	username declared with proper remarks	
	password declared with proper remarks	
	length of password as constant declared with proper remarks	

Write your pseudocode here: *{sample only}*

```
Length_password = 6
username = input("Enter your username ")
password = input("Enter your password")
If len(password) <= Length_password then
    print("Password is too short.")
else
    if password == username then
        print("Password is the same as username.")
    else
        print("Password is valid.")
    endif
endif
```

14	Question Text.	
		
		[6]