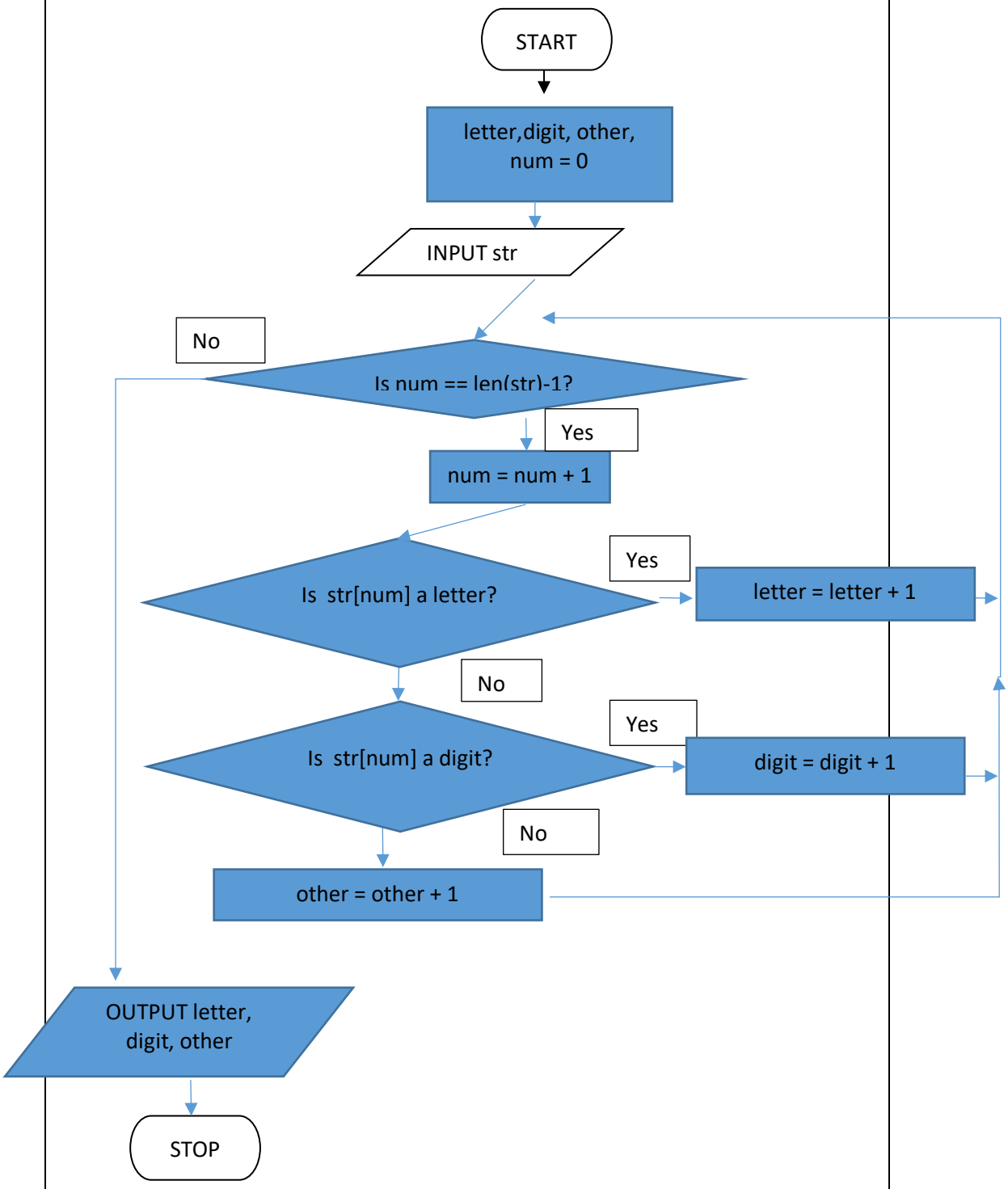
2020 4E Prelim Exam Computing Paper 1

1	True, False, True, False *[1] for each correct answer*.
	Total
2 (a)	- RGB colour codes, - Memory Dump, - IPv6 , - Media Access Control (MAC) address, - ASCII and Unicode, *[1] for each correct answer*.
2 (b)	1. It is to reduce the number of bytes required to represent the required information. 2. It is quick and easy to convert between hexadecimal and binary.
	Total
3 (a) (i)	Solving the smaller parts is more manageable and easier to understand. The parts are evaluated separately and the solutions to these parts are then combined to solve the original problem. *[1]* for each underline key ideas
(ii)	Modularity is to identify tasks that are of different natures. Usually, these tasks can be separated from each other to become distinct (and sometimes unrelated) sub-problems. This usually results in sub-problems that are different from each other. *[1]* for each underline key ideas
(b)	Pattern recognition is identifying similarities or common elements among problems, solutions and steps in solutions. [1]Useful as similar problems would likely be solved by similar solutions, and similar solutions means you can reuse them. *[1]* for each underline key ideas
	Total
4 (a)	Modulation – It is the process of converting digital data into a form suitable for transmission. *[1]* for each underline key ideas
4 (b)	Router – Device that forwards packets between separate networks. *[1]* for each underline key ideas

4 (c)	Data transfer is typically faster and more secure. (advantage) Faster : wired network typically has higher bandwidth than wireless network More secure : to snoop data, you need to have access to the physical hardware and wire while for wireless network, there is no need to have physical access. *[1]* for advantage and [1] for explanation
4 (b)	Wireless network is low in cost and easy to configure and manage. (advantages) Low in cost : wireless network typically cost less as there is less cables to run Easy to configure and manage : easier for devices to join the network as there is no need to access a physical access point. No cables to manage and maintain. *[1]* for advantage and [1] for explanation
	Total
5 (a)	Make regular backups Avoid opening emails/attachments/files from unknown sources Install and configure a firewall Install anti-virus anti-spyware software and perform regular scan Update software regularly *Any 2. [1]* for each.
(b)	Phishing – Use of emails and fake websites, that appear to be real, to trick people to enter their IDs and passwords and thus stealing them Pharming – Interception of requests sent from a computer to a real website, redirecting the request to a fake website for people to enter their IDs and passwords. *[1]* for each underline key ideas
	Total
6 (a)	An interpreter is a code translator program that translates source code into machine code while the interpreted program is running ***[1]*** *for each key point*
6 (b)	- Changes to the source code take effect immediately. - Interpreters usually offer an interactive mode, which facilitates learning and experimentation.

6 (c)	- Runs slower than compiled codes. - Interpreter is required whenever the program is run. - syntax errors may disrupt the running of a program. Any 2.
	Total

7	Logic
	- Initialization of counters (before loop) [1]
	- Input str(before loop)[1]
	- For loop management of the str[1]
	- Check for letter/digit[1]
	- Update letter/digit count[1]
	- Update non-letter and non-digit count for all others[1]
	- Output of number of letters, number of digits, number of others[2]
	
	PSEUDOCODE
	
	digit = 0
	
	letter = 0
	
	other = 0
	
	INPUT str
	
	FOR i in str
	
	IF i is a letter THEN
	
	letter = letter + 1
	
	ELIF i is a digit THEN
	
	digit = digit + 1
	
	ELSE
	
	other = other + 1
	
	ENDIF
	
	NEXT
	
	OUTPUT “Number of letters=”, letter
	
	OUTPUT “Number of digits=”, digit
	
	OUTPUT “Number of other alphanumeric=”, other



-1 for each wrong symbol, missing yes/no, wrong flow

		Total

<table>
<tr><td>8

(a)</td><td>Error 1: <code>WHILE Count_student <= number_sec_1 DO</code>

Correction: <code>WHILE Count_student < number_sec_1 DO</code>

<code>Or</code>

Error 1: <code>Count_student = 0</code>

Correction: <code>Count_student = 1</code>

Error 2: <code>bmi = weight / height * height</code>

Correction: <code>bmi = weight / (height * height)</code>

Error 3: <code>IF bmi >= 27.0 THEN</code>

Correction: <code>IF bmi > 27.0 THEN</code>

Error 4: <code>No increment of variable Count_student</code>

Correction: <code>Count_student = Count_student + 1 statement must be outside of IF condition and inside WHILE loop</code></td></tr>
<tr><td>(b)

(i)</td><td>Presence/Format/Range check all possible. [1]
Presence – any entry or not
Format – only digits entered
Range – valid range of number of students, eg. must be greater than 0 and less than 5000
[1] for description</td></tr>
<tr><td>(ii)</td><td>Presence/Format/Range/length check</td></tr>
<tr><td>(c)</td><td>Designing good test cases is important because it is usually <u>impossible to test every possible input</u> combination. We should <u>focus</u> on situations where errors are most likely to occur.
[1] for each key underlined point</td></tr>
<tr><td>(d)</td><td><table><tr><th>Test condition</th><th>Test data</th></tr><tr><td>Error condition</td><td>0 to 14.9</td></tr><tr><td>Boundary condition</td><td>15</td></tr></table></td></tr>
<tr><td></td><td>Total</td></tr>
<tr><td>9
(a)</td><td>B4 – currency
C4 – number
D4 – percentage

[1] each</td></tr>
</table>

(b) (i)	=sum()
(b) (ii)	=MAX(B4:B14)-MIN(B4:B14) [1] each for MAX and MIN
(b) (iii)	=-FV(D4/12,C4,0,B4) [1] for FV and [1] for correct inputs
(b) (iv)	=IF(AND(C4<=12,B4<=1000), "YES", "NO") [1] for IF and its valid inputs and [1] for AND and its valid inputs
	Total
10 (a) (i)	*Q* = (*A* AND *B*) OR (NOT *A* AND NOT *B*) [1] for (*A* AND *B*) and [1] for (NOT *A* AND NOT *B*). -1 if no/wrong OR
(a) (ii)	When both A and B are switched ON (1), C is ON and therefore Q is ON. When both A and B are switched off (0), D is ON and E is ON, making F ON and therefore Q is also ON. When either A or B is OFF, C is OFF and F is also OFF, giving Q OFF. [1] for each explanation of the 4 combinations of the inputs.
9 (b)	<table><tr><th>A</th><th>B</th><th>X</th></tr><tr><td>0</td><td>0</td><td>1</td></tr><tr><td>0</td><td>1</td><td>1</td></tr><tr><td>1</td><td>0</td><td>1</td></tr><tr><td>1</td><td>1</td><td>0</td></tr></table> **[1]** for each correct row
	Total