2019 SEC 4 PRELIMINARY EXAMINATION MARKING SCHEME

Qn 1	Marking Scheme / Answer	Marks
(a)	Data bus	**1**
(b)	Arithmetic logic unit	**1**
(c)	ROM	**1**

Qn 2	Marking Scheme / Answer	Marks
(a)	A byte is made up on 8 bits.	**1**
(b)	A megabyte is 1000 000 bytes. A mebibyte is 2^{20} or 1048576 bytes. One mebibyte is 1.048576 megabytes (3 sig. fig. or more is accepted)	 **1** **1**
(c)	64 GB = 64 x 10^6 KB Max number of images = 64 x 10^6 / 500 = 128 000	**1** **1**

Qn 3	Marking Scheme / Answer	Marks
(a)	Number of different colours = 16^6 = 16777216	**1**
(b)	$(6B)_{16} = (10101011)_2$	**1**
(c)	$(D3)_{16}$ = 13 x16 + 3 x 1 = 211	**1** **1**

Qn 4	Marking Scheme / Answer	Marks
	Unicode is a computing industry standard for the handling of text character sets. It is used to represent a million unique characters from many different languages all over the world. Unicode uses 8 to 32 bits to represent each character.	**1** **1** **1**

Qn 5	Marking Scheme / Answer	Marks
(a)	The size of IPv4 address is 4 bytes (32 bits) long while the size of IPv6 address is 16 bytes (128 bits) long.	**2**
(b)	It is to increase the maximum number of IP addresses to overcome the problem of insufficient IP addresses due to increasing number of computers connected to the internet.	**1**

Qn 6	Marking Scheme / Answer	Marks
(a)	Media Access Control	**1**
(b)	They allow all devices to be uniquely identified.	**1**
(c)	First six digits: Manufacturer's identity number Last six digits: Device's serial number	**1** **1**

Qn 7	Marking Scheme / Answer	Marks

Field Name	Name of Validation Check	Example of data which would fail the validation check
Date of birth	Format Check	Alphabets involved. e.g. FIFTHJUNE
Gender	Presence Check	Empty String is Entered
Height	Range Check	Cannot be less than 0 metre or more than 3 m. e.g. -2, 5 e.t.c
Postal code	Length Check	e.g. 1234, 12345678

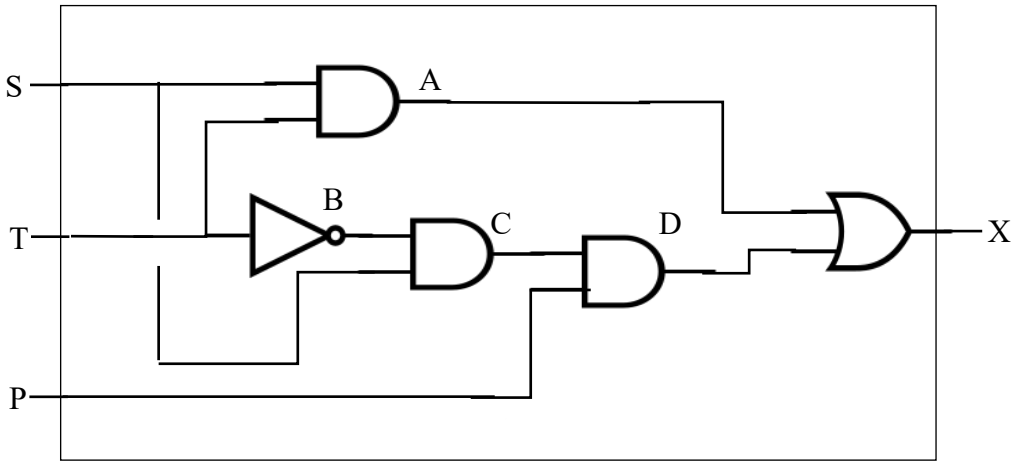
4 marks (1 mark for each correct row. At most 1 mark for duplicate validation checks)

Qn 8	Marking Scheme / Answer	Marks
(a)	Star topology Information such as inventory needs to be centralized, so that they can be updated and shared to the various staff easily.	**1** **1**
(b)	Inputs: Items in the supermarket. Items from suppliers. Items purchased by customers Outputs: Items in the supermarket. Items from suppliers. Items purchased by customers Processes: Total number of items = Items in supermarket + Items from suppliers – Items purchased by customers	**5**

Qn 9	Marking Scheme / Answer	Marks
(a)	- Use security tokens or 2FA (when making credit card payments) - Use strong passwords (to prevent unauthorized users to access online accounts). - Change passwords regularly (to prevent unauthorized users to access online accounts.)	**2**
(b)	Understand how e-commerce sites can share your information with advertisers in their privacy policies can help you to decide whether to obtain services from these sites in the first place.	**1**
(c)	- Lost of jobs as some traditional jobs are replaced - Lower profits for companies / shops that do not engage in e-commerce - More people choose to interact with computers rather than humans.	**2**

Qn 10	Marking Scheme / Answer	Marks
(a)	VLOOKUP	**1**

(b)	RANDBETWEEN	**1**
(c)	FLOOR	**1**
(d)	COUNTBLANK	**1**

Qn 11	**Marking Scheme / Answer**	**Marks**
(a)		**3**
(b)		

S	T	P	A	B	C	D	X
0	0	0	0	1	0	0	0
0	0	1	0	1	0	0	0
0	1	0	0	0	0	0	0
0	1	1	0	0	0	0	0
1	0	0	0	1	1	0	0
1	0	1	0	1	1	1	1
1	1	0	1	0	0	0	1
1	1	1	1	0	0	0	1

		5
(c)	S AND (P OR T)	**2**

Qn 12	Marking Scheme / Answer	Marks
(a)	- A checksum is a calculated value that is used to determine the integrity of transmitted data. - The data and the checksum are then sent together. - At the destination, the checksum is recalculated and compared to the sent checksum value. -If the checksum value of the received data matches the sent checksum value, the data was transmitted correctly. If they differ, an error has occurred.	**4**
(b)	No, it is not. It cannot be used to check for transpose errors. For example, both 1234 and 1324 gives a check digit of 0.	**1** **1**

(c)	Marking points
	- initialising of counters to count total valid numbers
	- initialising of counters to count total invalid numbers
	- control loop for 20 identification numbers, OR having input of 20 identification numbers.
	- extracting the five digits separately
	- computing the new checksum
	- use of conditional statement to check whether to increase the total number of valid or invalid numbers
	- output of the total number of valid identification numbers
	- output of total number of invalid identification numbers
	
	Below is a sample program.
	
	`count_valid = 0`
	`count_invalid = 0`
	`for id_num in main_list:`
	`  d1 = id_num[0]`
	`  d2 = id_num[1]`
	`  d3 = id_num[2]`
	`  d4 = id_num[3]`
	`  checksum = id_num[4]`
	`  total = d1 + d2 + d3 + d4`
	`  new_checksum = total(mod 5)`
	`  if checksum = new_checksum:`
	`  count_valid = count_valid + 1`
	`  else:`
	`  count_invalid = count_invalid + 1`
	`next id_num`
	`print("No of valid id numbers =",count_valid)`
	`print("No of invalid id numbers =",count_invalid)`
		6

Qn 13	Marking Scheme / Answer	Marks
	Line 5 `while True:`	**1** **1**
	Line 08 `if X.isdigit() and 1 ≤ int(X) ≤ 20 and TN.isdigit():`	**1** **1**
	Line 15 `temp = random.randint(1,7)`	**1** **1**
	Line 18 `elif temp == 1:`	**1** **1**
	Line 23 `elif success >= TN:`	**1** **1**

Qn 14	Marking Scheme / Answer	Marks
(a)	Trace table with answers `a = [-2, -3, 4, -1, -2, 1, 5, -3]`	**5**

X	Y	i	temp	output
-2				
	-2			
		1		
			-5	
	-3			
		2		
			1	
	4			
4				
		3		
			3	
	3			
		4		
			1	
	1			
		5		

				2		
		2				
			6			
				7		
		7				
	7					
			7			
				4		
		4				
			8			
					7	
(b)	The algorithm is used to find the {largest, maximum} contiguous {subarray, sublist} within a {array, list}. OR Use to solve the maximum sum subarray problem					**1**