

Sec 4E Prelim P1 Ans

1

(a)
Answer

<u>Term</u>	<u>Description</u>
Solid-state hard disk	Data that is stored is volatile and can be quickly accessed by the processor when needed.
Optical disc	Data is stored on a magnetic material that can be read or written by a magnetic "head".
Read-only memory	Data is stored as very small pits or indentations that can be read or written by a laser
Magnetic hard disk	Data is stored in electronic circuits called "flash memory" that have no moving parts.
	Data that is stored rarely has need for change or would be needed for a computer to start up.
	Data is stored in a square plastic enclosure composed of a thin and flexible disk of a magnetic storage medium with a fabric that removes dust particles from the spinning disk

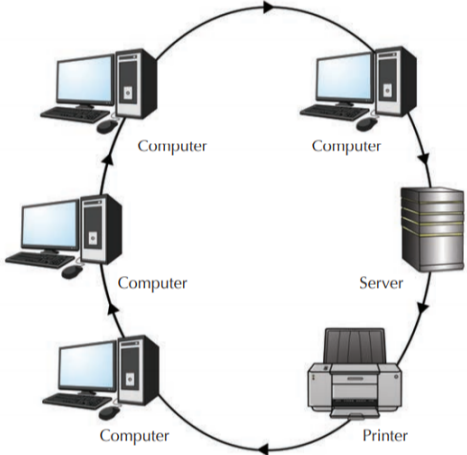
[4]

1	(b)	The central processing unit acts like the “brain” of a computer system. It contains the circuitry to interpret and execute program instructions. The <u>arithmetic logic unit</u> does all mathematical operations and logical calculations. Some computers have two such units to process two calculations simultaneously. That is called dual core technology. These units are also accompanied by several small data storage units called <u>processor registers</u>. The <u>control unit</u> receives orders from <u>random access memory</u> in the form of instruction and decode that instruction down into specific commands for other components inside computer system. It directs the data flow and how data should be stored, transmitted and received from different parts of the computer.	[4]
2	(a)	Module 1: character name and gender creation Module 2: character movement Module 3: shop furniture placement. Module 4: customer orders Or other logical modules that help to run the game.	[4]
	(b)	Input(s): <i>price</i>: float value of each item sold, <i>time</i>: timing which item is served Output(s): <i>total_earnings</i>: total amount of money earned Process required: if <i>time</i> is less then 30 seconds, add <i>price</i> x 1.2 to <i>total_earnings</i>. Else, add <i>price</i> to <i>total_earnings</i>.	[4]
	(ci)	valid_name is a <u>variable</u> as it can <u>hold two different values</u> .	[1]
	(cii)	<u>Range check</u> and <u>format check</u> Do not accept presence check.	[2]
	(ciii)	Boundary condition: “Dan” or “aaaaaaaaaaaaaaaa” (<u>inputs with 3 or 15 letters</u>.) Error condition: “Dan56” or “Da” (<u>inputs which trigger the checks for range and format</u>)	[4]
3	(ai)	(1101001) ₂	[1]
	(a ii)	107	

	(bi)	1000 1001 1100 1111 1111 0000	[1]
	(bii)	(FE) ₁₆	[1]
	(biii)	Network addresses ASCII codes Memory dump Any two	[2]
4	(a)	A worm is a computer program that <u>runs automatically</u> and attempts to <u>spread by sending copies of itself to other computers</u> in the network. Unlike a virus, a worm <u>does not need to attach itself</u> to an existing program.	[2]
	(b)	In a ransomware attack, the perpetrator <u>extorts</u> from the user financially and <u>threatens</u> to <u>prevent the user from recovering</u> his/her files if he/she does not comply.	[1]
	(c)	1. <u>Update Software Regularly</u> as worms run automatically and do not require human interaction to start running. Updates <u>allow bugs to be patched</u> and fixed early. 2. <u>Install Anti-Virus and Anti-Spyware Programs</u> to <u>detect</u> spyware or malware and stop them. 3. Avoid using any unsecured public wifi networks that can act as a vector for worms to travel across. Any two	[2]
	(d)	Phishing refers to the <u>use of emails and fake websites</u> that appear to be from <u>reputable companies</u> in order to <u>steal personal information</u> such as passwords and credit card numbers from users.	[1]
	(e)	Answer (Any 2): • The email claims to be from a company or bank and <u>asks for personal data or confidential information</u> . Most companies or banks will never ask for such information via email. • The email uses a <u>generic greeting</u> such as “Dear Customer” or “Dear User”. This is a sign that the email was <u>sent automatically</u> and not by a person. • The email <u>has inaccurate logos or grammatical and spelling errors</u> that suggest it is not from a legitimate source. • The email seems to come from a fake sender or from an <u>address or contact that does not match the supposed source</u> of the email. • The email contains <u>hyperlinks with destinations that do not match</u> what the hyperlink text says or are otherwise unexpected. • The tone of the email or chat is <u>excessively urgent or threatening</u> . Phishers often use such scare tactics to make victims act before they can think through their actions properly.	[2]
5	(a)	Purpose of the algorithm is to <u>check if a number input is a prime number</u> and <u>count the number of prime numbers and non-prime numbers</u> input into it.	[1]

			<table><tr><th>X</th><th>prime</th><th>not</th><th>check</th><th>OUTPUT</th></tr><tr><td>1</td><td></td><td></td><td></td><td></td></tr><tr><td>2</td><td>1</td><td></td><td></td><td></td></tr><tr><td>3</td><td></td><td></td><td>1</td><td></td></tr><tr><td></td><td>2</td><td></td><td></td><td></td></tr><tr><td>6</td><td></td><td></td><td>0</td><td></td></tr><tr><td></td><td></td><td>1</td><td></td><td></td></tr><tr><td>7</td><td></td><td></td><td>1</td><td></td></tr><tr><td></td><td></td><td></td><td>1</td><td></td></tr><tr><td></td><td></td><td></td><td>3</td><td></td></tr><tr><td></td><td></td><td></td><td>2</td><td></td></tr><tr><td></td><td></td><td></td><td>1</td><td></td></tr><tr><td></td><td>3</td><td></td><td></td><td></td></tr><tr><td>0</td><td></td><td></td><td></td><td>3, 1</td></tr></table>	X	prime	not	check	OUTPUT	1					2	1				3			1			2				6			0				1			7			1					1					3					2					1			3				0				3, 1	
X	prime	not	check	OUTPUT																																																																						
1																																																																										
2	1																																																																									
3			1																																																																							
	2																																																																									
6			0																																																																							
		1																																																																								
7			1																																																																							
			1																																																																							
			3																																																																							
			2																																																																							
			1																																																																							
	3																																																																									
0				3, 1																																																																						
6	(a)	NOR gate			[1]																																																																					
	(b)	AND gate																																																																								
		* Do not accept if “gate” is not written or if NOR / AND are not uppercase																																																																								

6	(c)	<table><tr><th rowspan="2">A</th><th rowspan="2">B</th><th rowspan="2">C</th><th colspan="4">Working space</th><th rowspan="2">X</th></tr><tr><th>D A NAND B</th><th>E D NAND A</th><th>F B NOR C</th><th>E NOR F</th></tr><tr><td>0</td><td>0</td><td>0</td><td>1</td><td>1</td><td>1</td><td>0</td><td>0</td></tr><tr><td>0</td><td>0</td><td>1</td><td>1</td><td>1</td><td>0</td><td>0</td><td>0</td></tr><tr><td>0</td><td>1</td><td>0</td><td>1</td><td>1</td><td>0</td><td>0</td><td>0</td></tr><tr><td>0</td><td>1</td><td>1</td><td>1</td><td>1</td><td>0</td><td>0</td><td>0</td></tr><tr><td>1</td><td>0</td><td>0</td><td>1</td><td>0</td><td>1</td><td>0</td><td>0</td></tr><tr><td>1</td><td>0</td><td>1</td><td>1</td><td>0</td><td>0</td><td>1</td><td>1</td></tr><tr><td>1</td><td>1</td><td>0</td><td>0</td><td>1</td><td>0</td><td>0</td><td>0</td></tr><tr><td>1</td><td>1</td><td>1</td><td>0</td><td>1</td><td>0</td><td>0</td><td>0</td></tr></table>	A	B	C	Working space				X	D A NAND B	E D NAND A	F B NOR C	E NOR F	0	0	0	1	1	1	0	0	0	0	1	1	1	0	0	0	0	1	0	1	1	0	0	0	0	1	1	1	1	0	0	0	1	0	0	1	0	1	0	0	1	0	1	1	0	0	1	1	1	1	0	0	1	0	0	0	1	1	1	0	1	0	0	0	[5]
A	B	C				Working space					X																																																																				
			D A NAND B	E D NAND A	F B NOR C	E NOR F																																																																									
0	0	0	1	1	1	0	0																																																																								
0	0	1	1	1	0	0	0																																																																								
0	1	0	1	1	0	0	0																																																																								
0	1	1	1	1	0	0	0																																																																								
1	0	0	1	0	1	0	0																																																																								
1	0	1	1	0	0	1	1																																																																								
1	1	0	0	1	0	0	0																																																																								
1	1	1	0	1	0	0	0																																																																								
	(d)		[4]																																																																												
7	(ai)	Mobility of user. Wireless connection allows user to move around while still connected. Whereas a wired connection does not. Scalability. Wireless connection allows the home office to add in more devices but it is more cumbersome to add in devices for wired connection due to physical constraints	[2]																																																																												

		Speed of transmission. Wireless connection could be slower due to interference by physical obstruction such as walls and doors. Reason must be given. Other factors and reason cited in the textbook.	
	(aii)	Component 1: <u>router</u> Description: Device that forwards packets between separate networks. Component 2: <u>Wireless access point</u> Description: Network hardware that provides a connection between wireless devices. Other network devices such as network card, network hub and their description. Do not accept network cable or servers.	[4]
	(b)	 2 to 3 computers + 1 server and 1 printer connected in a ring will suffice. Devices may be represented by squares or rectangles. [1] awarded for drawing ringed connection [1] for labelling.	[2]
		Checksum is a <u>calculated value</u> that is <u>unique to the data</u> . It is sent together with the data. At the destination, the <u>checksum is recalculated and compared to the sent checksum</u> . <u>If the checksum values matches, the data was transmitted correctly</u> , if they differ, an error has occurred.	[3]
8	The sales records of a car company are as shown below:		
	(a)	A4 Number F21 Text	[1]
	(b)	=IF(D4>100000,"Y","N")	[1]

	(c)	=IF(AND(OR(C4="Oct",C4="Nov",C4="Dec"),D4>80000),"Y","N") OR statement – 1 mark IF and AND statement – 1 mark {Possible 3 marks?}	[2]
	(d)	=RANDBETWEEN(A4,A18)	[1]
	(e)	=IF(VLOOKUP(F20,A4:F18,6,FALSE)="Y", VLOOKUP(F20,A4:F18,2,FALSE),"No winner") VLOOKUP – 1 mark IF – 1 mark	[2]
8			