

## **20 - Information & Communication Technology**

### **Distribution of marks**

#### **Paper I**

Time Duration 02 hours

Questions 50

Total Marks  $50 \times 2 = 100$

#### **Paper II**

Time Duration 03 hours

**Part A - Structured Questions**

$04 \times 10 = 40$

**Part B - Essay Questions**

$15 \times 04 = 60$

**Paper II Total marks =  $40+60 = 100$**

$$\begin{aligned}\text{Final marks} &= \frac{\text{Paper I} + \text{Paper II}}{2} \\ &= \frac{100 + 100}{2} = 100\end{aligned}$$

## ଶ୍ରୀ ଲଙ୍କା ଶିଖାର ଦେଖାରନାମେନ୍ଦ୍ରିୟ ଚାନ୍ଦିକା ଆଶ୍ରମରେ ଥା ପର୍ଯ୍ୟନ୍ତ ଜୀବିତ

இலங்கைப் பரிட்சைத் தினைக்களாம்  
தேசிய மதிப்பிட்டிற்கும் பரிட்சித்தலுக்குமான சேவை

අ.පො.සි.උ.පෙ.විභාගය - 2014  
ක.පො.තු (හෙයර් තර)ප් පරිංශේ - 2014

வினாக்கள் ]- 20. வினாக்கள் ] Information & Communication Technology  
பாடம் பாடம் ]

ලකුණු දිගේ පරිපාරිය/ප්‍රස්ථා වෘත්තිකුම් තිෂ්පම - I පත්‍රය/පත්තිරුම I

ප්‍රයෙන අංකය විශාල කිල.	පිළිබඳ අංකය විශාල කිල.								
01.	5	11.	1	21.	4	31.	3	41.	4
02.	4	12.	4	22.	3	32.	2	42.	5
03.	4	13.	4	23.	2	33.	1	43.	5
04.	4	14.	2	24.	1	34.	3	44.	5
05.	3	15.	4	25.	1	35.	4	45.	2
06.	2	16.	3	26.	4	36.	3	46.	2/5
07.	2	17.	2	27.	3	37.	2	47.	4
08.	1	18.	2	28.	1	38.	3	48.	2
09.	2	19.	5	29.	4	39.	3	49.	5
10.	4	20.	2	30.	4	40.	4	50.	(1) 3/5

විශේෂ උපදෙස්  
විසොට අරුවුයුත්තල්

## ලක් පිළිතුරකට ගැන සරියාණ විනොදක්

ජාත්‍ය

2

බැංකින් 50  
ප්‍රාග්ධන විතම්

$$\text{மூல உடைய } 12 \times 50 = 100 \\ \text{மொத்தப் புள்ளிகள்}$$

PART II

Question Number	Expected Answer	Allocation of marks
<b><u>Part A : Structured</u></b>		
1(a)	<pre> &lt;dl&gt;   &lt;dt&gt;CPU&lt;/dt&gt;   &lt;dd&gt;Central Processing Unit&lt;/dd&gt;   &lt;dt&gt;ROM&lt;/dt&gt;   &lt;dd&gt;Read Only Memory&lt;/dd&gt; &lt;/dl&gt; </pre> <ul style="list-style-type: none"> <li>• At least one pair of <code>&lt;dt&gt;</code> and <code>&lt;/dt&gt;</code> : 1 mark</li> <li>• At least one pair of <code>&lt;dd&gt;</code> and <code>&lt;/dd&gt;</code> : 1 mark</li> <li>• Complete answer : 1 mark</li> </ul>	Total 3
1(b) (i)	Greetings!	
1(b) (ii)	<p>Greetings!</p> <p><b>Marks:</b>  <b>1 mark for each Greeting!</b></p>	Total 2
1(c)	<p>&lt;p&gt;Programming Languages Used:&lt;/p&gt; or</p> <p>&lt;hN&gt; Programming Languages Used:&lt;/hN&gt; N = 2,3 or <span style="color: red;">(n+1)</span></p> <p>&lt;b&gt; Programming Languages Used:&lt;/b&gt; <span style="color: red;">&lt;br/&gt; or</span></p> <p>Programming Languages Used: <span style="color: red;">&lt;br/&gt; or</span></p> <p>Programming Languages Used: surrounded by invalid HTML tags or valid tags with incorrect order <span style="color: red;">&lt;br/&gt;</span></p> <p><b>Marks:</b></p> <p><b>Any of the above: programming languages used : 1 mark</b></p> <p><b>No marks for answers without colon (:) .</b></p> <hr/> <p>C &lt;input type="checkbox" .... .&gt;</p> <p>Java &lt;input type="checkbox" .. .... ..&gt;</p> <p>Python&lt;input type="checkbox" .. .&gt;</p> <p><b>Each line start with a text, input tag and the attribute "checkbox" : 1 mark (maximum 3 marks)</b></p> <p><b>complete answer with strict syntax ( which displays the given output as appeared in the paper) : 1 mark</b></p>	Total 1
		Total 4

<p>②</p> <p>2(a)</p>	<p>One's complement of 0001 is 1110 (1 mark)  <math>1110 + 1</math> (1 mark) = 1111 (1 mark; Equal sign is essential)          or          number of bits = 4 (1 mark)          Getting <math>2^4</math> (1 mark)  <math>(2^4 - 1)_{10} = 1111_2</math> (1 mark; Equal sign is essential)  <i>or Reverse Order is accepted</i></p>	<p>Total 3</p>								
<p>2(b)</p>	<p>C2C Agree? No (1 mark)          Reason: The transaction is between the ABC Company and a consumer or definition of C2C (1 mark)            B2C Agree? YES (1 mark)          Reason: The transaction is between the ABC Company and a consumer or definition of B2C (1 mark)</p>	<p>Total 4</p>								
<p>2(c)</p>	<p>B Software Agent (1 mark)            A/C Company Web Site/ Consumer (1 mark each)</p>	<p>Total 3</p>								
<p>③</p> <p>3(a)</p>	<p>A. name (1 mark)          B. 1 and C: m (1 mark) <i>or n or *</i>          D: name or grade (1 mark)          E. grade or name (1 mark)</p>	<p>Total 4</p>								
<p>3(b)</p>	<p>One-to-many / m:1 / many to one (1 mark) <i>[1:m no marks]</i>  <i>*:1</i>          One student belongs to one house ( any row from the student table) (1 mark)            One house can have more than one students (First two rows in the student table) (1 mark)</p>	<p>Total 3</p>								
<p>3(c)(i)</p>	<table border="1"> <tr> <td>StudentID</td> <td>name</td> <td>grade</td> <td>houseID</td> </tr> <tr> <td>STU004</td> <td>Hakeem</td> <td>11</td> <td>HS3</td> </tr> </table> <p>The answer similar to the above two rows: 2 marks (NO INFORMATION LOSS)          Spelling mistakes/additional spaces/case changes DEDUCT 1 mark</p>	StudentID	name	grade	houseID	STU004	Hakeem	11	HS3	<p>Total 2</p>
StudentID	name	grade	houseID							
STU004	Hakeem	11	HS3							
<p>3(c)(ii)</p>	<p>Error            Attribute name and houseID (<u>one is enough</u>) appear in both tables. (1 mark)</p>	<p>Total 1</p>								

A- ④

4(a)	<p>Maximum <u>usable size of memory</u> = 4GB = <math>2^{32}</math> bytes ( <b>1 mark</b> )</p> <p>Maximum <u>Number of different addresses</u> required = <math>2^{32}</math> (<b>1 mark</b>)</p> <p>Number of minimum <u>bits required for an address</u> = 32 bits</p> <p>Answer Therefore <u>width of the address bus</u> = 32 bits. (<b>1 mark</b>)</p>	Total 3
4(b)	<p>NO ( <b>1 mark</b> )</p> <p>Process is a program in execution (not just an alternative name for a program). (<b>2 mark</b>) <i>ପରିବାସିତ କରିବାର ପ୍ରକାର</i></p>	Total 3
4(c)	<p>A. Ready ( <b>1 mark</b> ) <i>ପରିବାସିତ / Waiting : No actual</i></p> <p>B: Running ( <b>1 mark</b> ) <i>କରିବାର</i></p> <p>C: Terminated ( <b>1 mark</b> ) <i>Terminated / ପରିବାସିତ ନାହିଁ</i></p> <p>D: Blocked ( <b>1 mark</b> ) <i>Blocked / ପରିବାସିତ ନାହିଁ</i></p>	Total 4

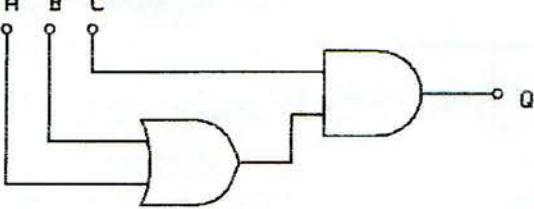
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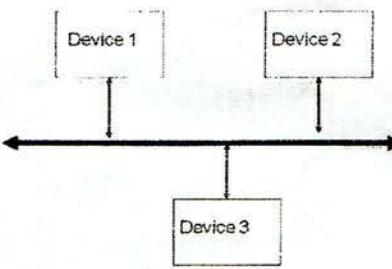
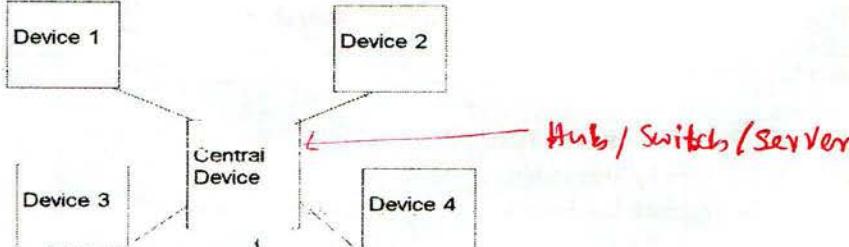
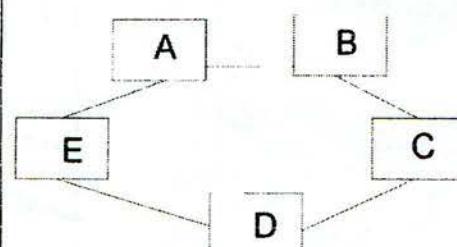
**PART B: Essay**

B-①

1(a)	Motion detector: A	Glass break detector: B	Blackout detector: C	Alarm/output: Q (If not defined, deduct 1 mark from the total marks)	
	A	B	C	Q	
	0	0	0	0	
	0	0	1	0	
	0	1	0	0	
	0	1	1	1	
	1	0	0	0	
	1	0	1	1	
	1	1	0	0	
	1	1	1	1	
Each correct row with Q=1 will get 1 mark. (Maximum 3 marks)					
Correct table: 1 mark					Total 4
Note: <b>Marks should be given only when the given names for detectors or well defined symbols for detectors are used.</b> No marks will be given for other cases.					

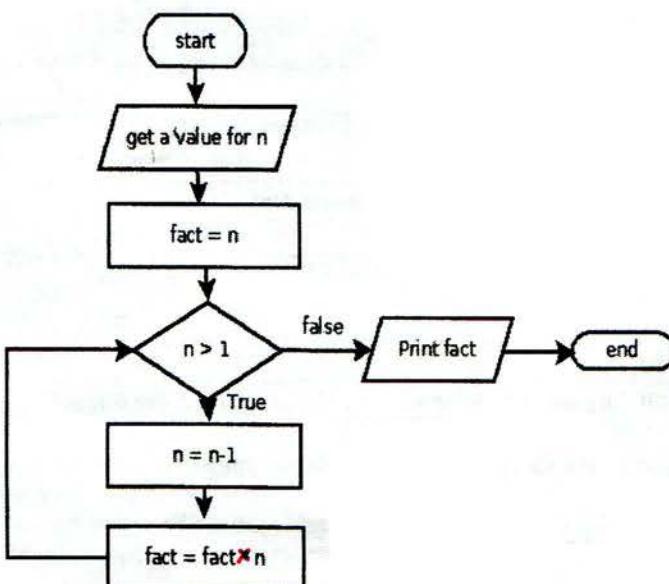
$$Q = ABC + C(A+B) \quad (\text{According to Scenario})$$

1(b)(i)	$Q = \bar{A} \cdot B \cdot C + A \cdot \bar{B} \cdot C + A \cdot B \cdot C \quad (2 \text{ mark})$ if the process is correct ONLY. $Q = C \cdot (B+A) \quad Q = \bar{X}Y_2 + X\bar{Y}_2 + XY_2$	Total 2							
1(b)(ii)	$= B \cdot C \cdot (A' + A) + A \cdot B' \cdot C \quad \text{or}$ $= B \cdot C \cdot (A' + A) + A \cdot B' \cdot C + A \cdot B \cdot C \quad \text{if } A + A = A \text{ is given}$ $(1 \text{ mark})$ $= B \cdot C + A \cdot \bar{B} \cdot C \quad (\bar{A} + A = 1)$ $= C \cdot (B + A \cdot \bar{B})$ $= C \cdot (B + A) \quad (B + A \cdot \bar{B} = B + A)$ $\text{or } B \cdot (A + C) = B \cdot A + B \cdot C$  If $C \cdot (B + A)$ is obtained correctly as the final answer, give <b>1 mark</b>  For <b>two relevant rules</b> depending on the approach: <b>1 mark each</b>	Total 4							
1(b)(iii)	 <b>2 or 0 marks</b> <i>[Only If three marks collect above II]</i>	Total 2							
1(c)	Yes. <b>(1 mark)</b>  Answer should include the following facts: 1. Break-ins are indicated by alarm triggers. 2. If Alarm is to be triggered, blackout detector (c) must always be active. <b>(2 marks)</b>	Total 3							
2(a)	<table border="1"> <tr><td>Application</td></tr> <tr><td>Presentation</td></tr> <tr><td>Session</td></tr> <tr><td>Transport</td></tr> <tr><td>Network</td></tr> <tr><td>Data Link</td></tr> <tr><td>Physical</td></tr> </table> <b>( Either 0 or 3 marks)</b>	Application	Presentation	Session	Transport	Network	Data Link	Physical	Total 3
Application									
Presentation									
Session									
Transport									
Network									
Data Link									
Physical									

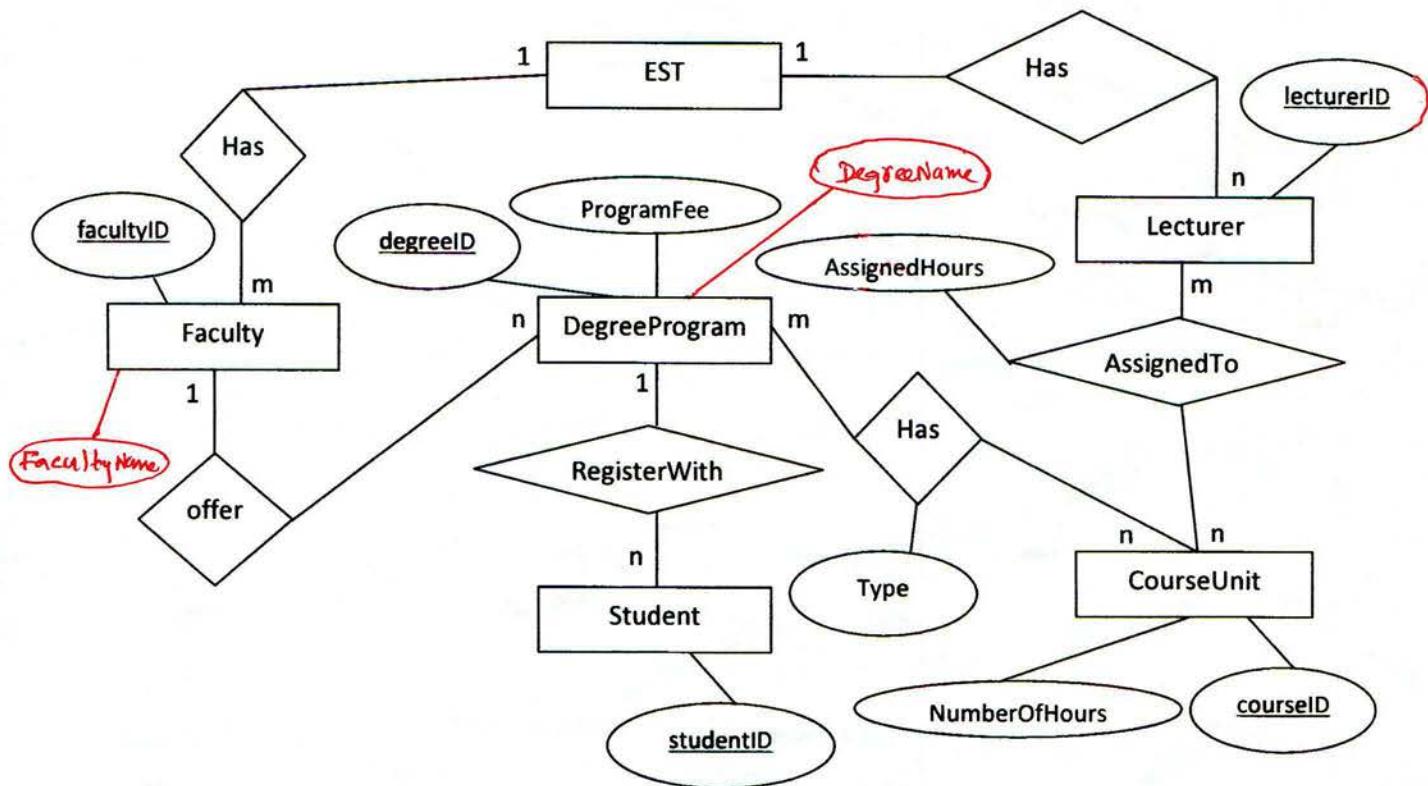
2(b)	<p>1 This is an example for a potential attack (phishing).</p> <p>2. The sender of the email can be easily faked and therefore should not be trusted.</p> <p>When the answer is either 1 or 2 above, give <b>2 marks</b>.</p> <p>or</p> <p><b>The attacker can collect the user names and the passwords of the email users (2 marks) who comply with this request and their accounts can be used by the attacker (1 mark) to launch further attacks (2 marks).</b></p>	Total 5
2(c)(i)		Total 1
2(c)(ii)		Total 1
2(c)(iii)		Total 1
2(d)	<p>No.(1 mark)</p> <p>Light takes 10 ms = <math>3000\text{Km} / 300000\text{Km per Sec} * 1000\text{ms}</math></p> <p>(calculation 1 mark) to travel from X to Y</p> <p>Therefore it is impossible to get an RTT less than 20ms (10ms * 2) (2 marks).</p>	Total 4

B-③

3(a)	<p>The manual process:</p> <ul style="list-style-type: none"><li>• <b>Consumes significant amount</b> of each employee's <b>working time</b>. <b>(2 marks)</b></li><li>• <b>Delays the salary increments</b> of the employees and make them unhappy <b>(2 marks)</b></li></ul>	<b>Total 4</b>
3(b)	<p>Agree. <b>(1 mark)</b></p> <p>To <b>reduce the time taken by the Finance expert</b> <b>(2 marks)</b> to prepare the special report, we can introduce an Artificial intelligence based system to <b>replace/assist the Finance expert</b>. <b>(2 mark)</b></p> <p>Suggested AI application is <b>Expert System</b> or <b>Agent System</b>.</p> <p style="text-align: center;"><b>Software Agent</b></p>	<b>Total 5</b>
3(c)	<p>Yes. <b>(1 mark)</b></p> <p>The employees have requested the management to expedite this process and give them the increment in-time. So the company has catered to the request by introducing online evaluation process. Therefore, <b>it is a service given by the company to its employees in an online mode</b>. <b>(2 marks)</b></p> <p>Therefore it is B2E.</p>	<b>Total 3</b>
3(d)	<p>Damage the employee privacy or Abusing company strategic information by a competitor or Any other negative impact</p>	<b>Total 3</b>
4(a)(i)	<p>Print the string "Enter a number" on the screen and Wait till user input. Assign the user input to the variable x. <b>( 1mark for all three steps)</b></p> <p>Type of x is string. <b>(1mark)</b></p>	<b>Total 2</b>
4(a)(ii)	<p>Open a file named "myfile.txt" to <b>read data</b> (by creating a file object) Assign the file (reference to object) to the variable infile. <b>( 1 mark for the two steps above)</b></p> <p>The infile variable type file (object). <b>(1 marks)</b></p>	<b>Total 2</b>

4(a)(iii)	<p>Split the string “a,b,c” by the character “,” and Assign the output to the variable a. ( 1 mark for the two steps above)</p> <p>Type is an array/list ( 1 mark)</p>	Total 2
4(b)(i)	 <pre> graph TD     start([start]) --&gt; get[/get a value for n/]     get --&gt; factSet[fact = n]     factSet --&gt; decision{&gt;n}     decision -- True --&gt; nMin1[n = n-1]     nMin1 --&gt; factCalc[fact = fact * n]     factCalc --&gt; decision     decision -- False --&gt; print[/Print fact/]     print --&gt; end([end])   </pre> <p>Match any flowcharts</p>	Total 5

	<p>Start and End (1 mark)</p> <p>Correct decision making symbol (1 mark) <i>with the correct decision</i></p> <p>Correct output ( 1 mark)</p> <p>For the correct logic (2 marks)</p> <p><b>Variation: the given number can be kept in a variable.</b></p> <p><b>Note: Any variations contact Controllers.</b></p>	
4(b)(ii)	<pre>def fact():     n = int(input("Enter a number "))     fact = n     while (n &gt; 1)         n = n-1         fact = fact * n     print(fact)</pre> <p>Correct function definition: 1 mark</p> <p>Correct repetition: 1 mark</p> <p>Correct output: 1 mark</p> <p>Correct implementation of the flowchart: 1 mark</p>	Total 4
5	<p>Refer ER diagram.</p> <p>Each entity with its primary key – 1 mark ( 5 marks)</p> <p>Each relationship with correct cardinality and attributes – 1 mark (6 marks)</p> <p>Each attribute except primary key – 1 mark (4 marks)</p> <p>Entities and primary keys:</p> <p>Faculty – facultyID Lecturer – lecturerID DegreeProgram – degreeID CourseUnit – courseID Student -studentID</p> <p>Different names are allowed if the correct scenario can be obtained from the ER diagram.</p> <p><i>DegreeName FacultyName ProgramFee NoofHoursforUnit</i></p>	Total 15



4 attributes should be:

**DegreeName**  
**FacultyName**  
**ProgramFee**  
**NumberOfHours**

OR

Any other relevant attributes with assumptions  
 (StudentName, Address, LectureName, DOB, ContactNo, ...)

6(a)	<p>Requirement 1  A student <b>shall</b> be able to borrow a book or  The library Assistants <b>shall</b> be able to lend a book <b>or</b>  Shall be able to facilitate lending a book <b>(without actor)</b></p> <p>Requirement 2:  A student <b>shall</b> be able to return a borrowed book or  The library assistants <b>shall</b> be able to accept returned books. <b>or</b>  Shall be able to facilitate book returns <b>(without actor)</b></p> <p>Requirement 3:  The library assistants <b>shall / should</b> be able to answer student queries.  <b>(IEEE standard – 2 marks each)</b>  <b>(Missing actor deduct 1 mark)</b></p>	Total 6
6(b)	<p><b>Efficiency (1 mark)</b>  <b>Reason:</b> heavy work load or any other reason from the scenario which negatively affects on the efficiency <b>(1 mark)</b>.</p> <p><b>Accuracy(1 mark)</b>  <b>Reason:</b> Mistakes or any other reason from the scenario which negatively affects on the accuracy <b>(1 mark)</b>.</p>	Total 4
6(c)	<p>Computerized solutions: <b>for functional requirement</b>  Use of Bar code readers, RFID, e-books, on-line services, on-line FAQs, etc.  <b>(1 mark each up to 2 marks)</b></p> <p>Non computer based solutions:  Increase the number of counters <u>and</u> library assistants,  Any other acceptable solution without using electronic devices.  <b>(3 marks)</b></p> <p><b>Radio Frequency Identification Device ← RFID</b></p>	Total 5

Kosala Rajapaksha

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