



Department of Examinations - Sri Lanka

G.C.E. (A/L) Examination - 2014

**20 - Information & Communication
Technology**

Marking Scheme

This has been prepared for the use of marking examiners. Some changes would be made according to the views presented at the chief examiner's meeting.

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 = $40 + 60 = 100$

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

ශ්‍රී ලංකා විභාග දෙපාර්තමේන්තුව

ජාතික ඇගයීම් හා පරීක්ෂණ කොටුව

இலங்கைப் பரீட்சைத் திணைக்களம்

தேசிய மதிப்பீட்டிற்கும் பரீட்சித்தலுக்குமான சேவை

අ.පො.ස.(උ.පෙළ) විභාගය - 2014

க.பொ.த (உயர் தர)ப் பரீட்சை - 2014

විෂය අංකය } 20
பாட இலக்கம் }

විෂය } Information & Communication Technology
பாடம் }

ලකුණු දීමේ පටිපාටිය/புள்ளி வழங்கும் திட்டம் - I පත්‍රය/பத்திரம் I

ප්‍රශ්න අංකය வினா இல.	පිළිතුර අංකය விடை இல.	ප්‍රශ්න අංකය வினா இல.	පිළිතුර අංකය விடை இல.	ප්‍රශ්න අංකය வினா இல.	පිළිතුර අංකය விடை இல.	ප්‍රශ්න අංකය வினா இல.	පිළිතුර අංකය விடை இல.	ප්‍රශ්න අංකය வினா இல.	පිළිතුර අංකය விடை இல.
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 }
விசேட அறிவுறுத்தல் }

එක් පිළිතුරකට }
ஒரு சரியான விடைக்கு } **2**

මැගින් 50 }
புள்ளி வீதம் }

මුළු ලකුණු 02 x 50 = 100
மொத்தப் புள்ளிகள்

②	<p>2(a) One's complement of 0001 is 1110 (1 mark) 1110 + 1 (1 mark) = 1111 (1 mark; Equal sign is essential) or number of bits = 4 (1 mark) Getting 2^4 (1 mark) $(2^4 - 1)_{10} = 1111_2$ (1 mark; Equal sign is essential) <i>or Reverse Order is accepted</i></p>	Total 3								
	<p>2(b) 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>	Total 4								
	<p>2(c) B Software Agent (1 mark) A/C Company Web Site/ Consumer (1 mark each)</p>	Total 3								
③	<p>3(a) 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>	Total 4								
	<p>3(b) One-to-many / m:1 / many to one (1 mark) <i>[1: m or 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>	Total 3								
	<p>3(c)(i)</p> <table border="1"> <thead> <tr> <th>studentID</th> <th>name</th> <th>grade</th> <th>houseID</th> </tr> </thead> <tbody> <tr> <td>STU004</td> <td>Hakeem</td> <td>11</td> <td>HS3</td> </tr> </tbody> </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	Total 2
studentID	name	grade	houseID							
STU004	Hakeem	11	HS3							
	<p>3(c)(ii) Error Attribute name and houseID (<u>one is enough</u>) appear in both tables. (1 mark)</p>	Total 1								

A- ④

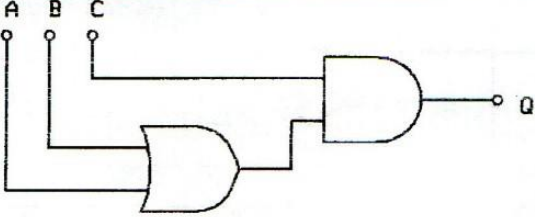
4(a)	<p>Maximum <u>usable size of memory</u> = 4GB = 2^{32} bytes (1 mark)</p> <p>Maximum <u>Number of different addresses</u> required = 2^{32} (1 mark)</p> <p>Number of minimum <u>bits required for an address</u> = 32 bits</p> <p>Answer: Therefore <u>width of the address bus</u> = 32 bits. (1 mark)</p>	Total 3
4(b)	<p>NO (1 mark)</p> <p>Process is a program in execution (not just an alternative name for a program). (2 mark) <i>ಎಣ್ಣೆ ಪ್ರಕ್ರಿಯೆಯು ಉಪಯುಕ್ತವಾಗಿದೆ</i></p>	Total 3
4(c)	<p>A. Ready (1 mark) <i>ಎಡೆ ಬಿಡುವು / waiting : No actual</i></p> <p>B: Running (1 mark) <i>ವಿನ್ಯಾಸ</i></p> <p>C: Terminated (1 mark) <i>/ terminate / ಪ್ರಕ್ರಿಯೆ ಕೊನೆ</i></p> <p>D: Blocked (1 mark) <i>/ Block / ತಡೆಗಟ್ಟಿದ ಕಾಲ</i></p>	Total 4

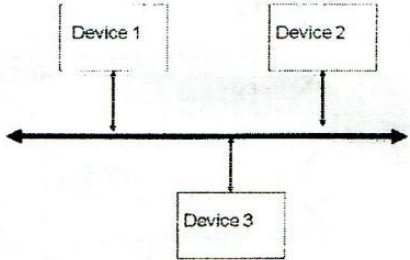
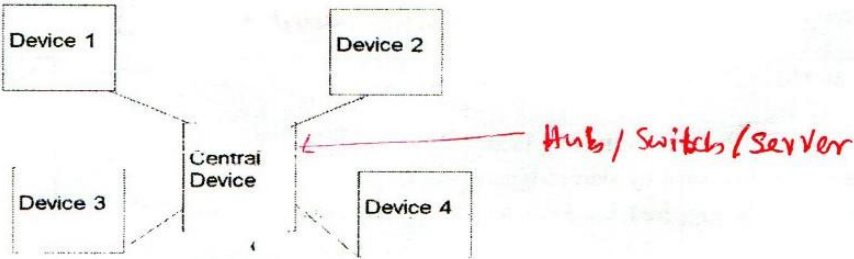
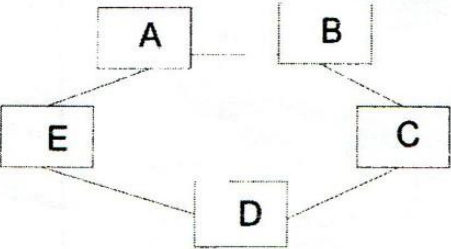
PART B: Essay

B- ①

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

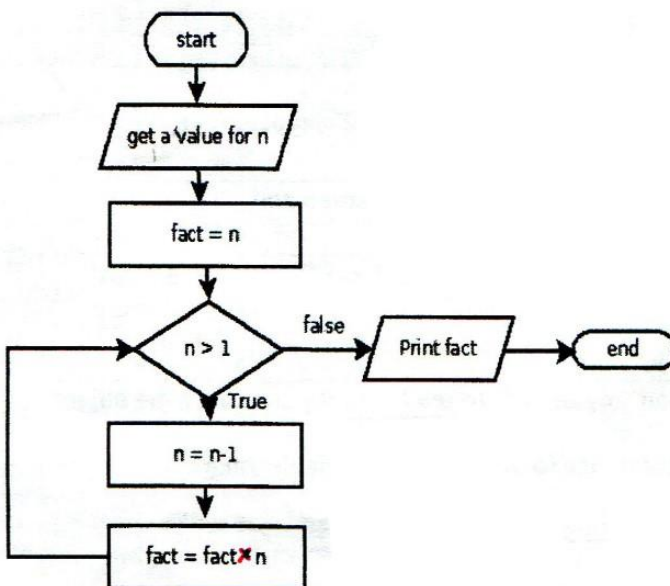
$$Q = ABC + C(A+B) \text{ (According to Scenario)}$$

1(b)(i)	$Q = \bar{A}.B.C + A.\bar{B}.C + A.B.C$ (2 mark) if the process is correct ONLY. $Q = C.(B+A)$ $Q = \bar{X}_1Y_2 + X_1\bar{Y}_2 + X_1Y_2$	Total 2							
1(b)(ii)	$= B.C.(A'+A) + A.B'.C$ or $= B.C.(A'+A) + A.B'.C + A.B.C$ if $A + A = A$ is given (1 mark) $= B.C + A.\bar{B}.C$ ($\bar{A} + A = 1$) $= C.(B + A.\bar{B}')$ $= C.(B + A)$ ($B + A.\bar{B} = B + A$) or $B.(A+C) = B.A+B.C$ If $C.(B+A)$ is obtained correctly as the final answer, give 1 mark For two relevant rules depending on the approach: 1 mark each	Total 4							
1(b)(iii)	 <p>2 or 0 marks [Only If three marks collect about II]</p>	Total 2							
1(c)	Yes. (1 mark) 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. (2 marks)	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> <p>(Either 0 or 3 marks)</p>	Application	Presentation	Session	Transport	Network	Data Link	Physical	Total 3
Application									
Presentation									
Session									
Transport									
Network									
Data Link									
Physical									

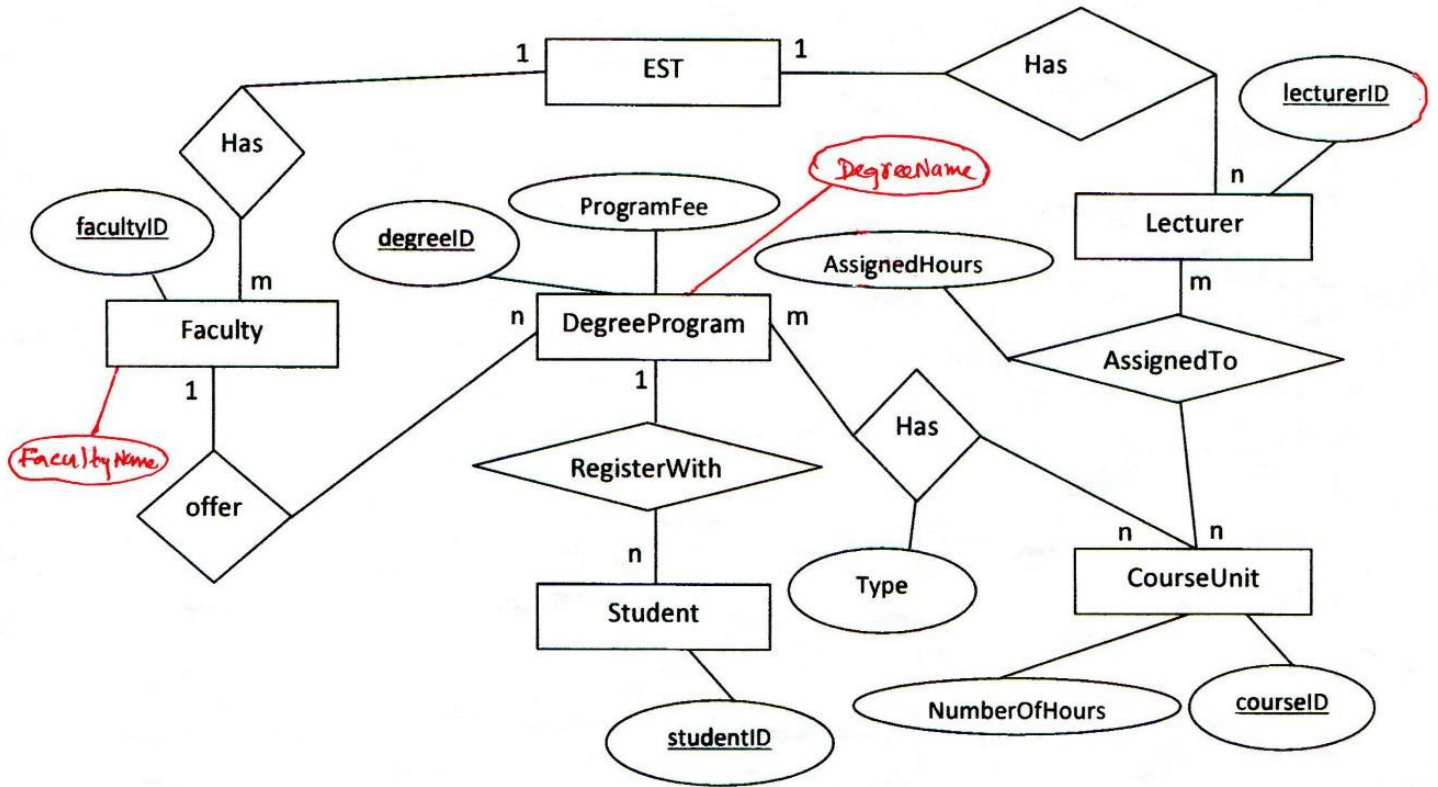
<p>2(b)</p>	<p>1 This is an example for a potential attack (phishing).</p> <p>2. The sender of the email can be easily faked and therefore should not be trusted.</p> <p>When the answer is either 1 or 2 above, give 2 marks.</p> <p>or</p> <p>The attacker can collect the user names and the passwords of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

B-3

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

<p>4(a)(iii)</p>	<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>	<p>Total 2</p>
<p>4(b)(i)</p>	 <pre> graph TD Start([start]) --> GetN[/get a value for n/] GetN --> FactN[fact = n] FactN --> Dec{n > 1} Dec -- True --> Nminus1[n = n-1] Nminus1 --> Factmul[fact = fact * n] Factmul --> Dec Dec -- false --> Print[/Print fact/] Print --> End([end]) </pre> <p><i>Matches any flow charts</i></p>	<p>Total 5</p>

	<p>Start and End (1 mark) Correct decision making symbol (1 mark) <i>with the correct decision</i> Correct output (1 mark) For the correct logic (2 marks)</p> <p>Variation: the given number can be kept in a variable. Note: Any variations contact Controllers.</p>	
4(b)(ii)	<pre>def fact(): n = int(input("Enter a number ")) fact = n while (n > 1) n = n-1 fact = fact * n print(fact)</pre> <p>Correct function definition: 1 mark Correct repetition: 1 mark Correct output: 1 mark 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) Each relationship with correct cardinality <u>and</u> attributes – 1 mark (6 marks) 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><i>DegreeName FacultyName ProgramFee NoofHoursforUnit</i></p> <p>Different names are allowed if the correct scenario can be obtained from the ER diagram.</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 shall be able to borrow a book or The library Assistants shall be able to lend a book <i>or</i> Shall be able to facilitate lending a book <i>(without actor)</i></p> <p>Requirement 2: A student shall be able to return a borrowed book or The library assistants shall be able to accept returned books. <i>or</i> Shall be able to facilitate book returns <i>(without actor)</i></p> <p>Requirement 3: The library assistants shall / should be able to answer student queries.</p> <p><i>(IEEE standard – 2 marks each)</i> <i>(Missing actor deduct 1 mark)</i></p>	Total 6
6(b)	<p>Efficiency (1 mark) Reason: heavy work load or any other reason from the scenario which negatively affects on the efficiency (1 mark).</p> <p>Accuracy(1 mark) Reason: Mistakes or any other reason from the scenario which negatively affects on the accuracy (1 mark).</p>	Total 4
6(c)	<p>Computerized solutions: <i>for functional requirement</i> Use of Bar code readers, RFID, e-books, on-line services, on-line FAQs, etc. (1 mark each up to 2 marks)</p> <p>Non computer based solutions: Increase the number of counters <u>and</u> library assistants, Any other acceptable solution without using electronic devices. (3 marks) <i>Radio Frequency Identification Device ← RFID</i></p>	Total 5

Kithsiri Abeysinghe