20 - Information & Communication Technology

Distribution of marks

Paper I

Time Duration 02 hours

Questions 50

Total Marks 50X2 = 100

Paper II

Time Duration 03 hours

Part A - Structured Questions

04X10 = 40

Part B - Essay Questions

15X04 = 60

Paper II Total marks = 40+60 =100

Final marks = $\frac{Paper\ I + Paper\ II}{2}$

$= \frac{100+100}{2}$ =100

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ජාතික අගයීම් හා පරීක්ෂණ සේවාව

இலங்கைப் பரீட்சைத் திணைக்களம்
தேசிய மதிப்பீட்டிற்கும் பரீட்சித்தலுக்குமான சேவை

අ.පො.ස.(උ.පෙළ) විභාගය - 2014
க.பொ.த (உயர் தர)ப் பரீட்சை - 2014

විෂයය අංකය / பாட இலக்கம் } 20 විෂයය / பாடம் } Information & Communication Technology

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

ප්‍රශ්න අංකය / வினா இல.	පිළිතුරු අංකය / விடை இல.	ප්‍රශ්න අංකය / வினா இல.	පිළිතුරු අංකය / விடை இல.	ප්‍රශ්න අංකය / வினா இல.	පිළිතුරු අංකය / விடை இல.	ප්‍රශ්න අංකය / வினா இல.	පිළිතුරු අංකය / விடை இல.	ප්‍රශ්න අංකය / வினா இல.	පිළිතුරු 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 ඒකක / ஒரு சரியான விடைக்கு ලකුණු (2) බැගින් 50 / புள்ள வீதம்

මුළු ලකුණු / மொத்தப் புள்ளிகள் 02 × 50 = **100**

PART II

Question Number	Expected Answer	Allocation of marks
	Part A : Structured	
1(a)	<dl> <dt>CPU</dt> <dd>Central Processing Unit</dd> <dt>ROM</dt> <dd>Read Only Memory</dd> </dl> • **At least one pair of <dt> and </dt> : 1 mark** • **At least one pair of <dd> and </dd> : 1 mark** • **Complete answer : 1 mark**	Total 3
1(b) (i) 1(b) (ii)	Greetings! Greetings! **Marks:** **1 mark for each Greeting!**	Total 2
1(c)	Programming Languages Used: or <hN> Programming Languages Used:</hN> N = 2,3 or (N≠1) Programming Languages Used: or Programming Languages Used: or Programming Languages Used: surrounded by invalid HTML tags or valid tags with incorrect order **Marks:** **Any of the above: programming languages used : 1 mark** **No marks for answers without colon (:).**	Total 1
	C <input type="checkbox" …. .> Java <input type="checkbox" .. …. ..> Python<input type="checkbox" .. .> **Each line start with a text, input tag and the attribute "checkbox" : 1 mark (maximum 3 marks)** **complete answer with strict syntax (which displays the given output as appeared in the paper) : 1 mark**	Total 4

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**) or Reverse Order is accepted	Total 3
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**)	Total 4
2(c)	B Software Agent (**1 mark**) A/C Company Web Site/ Consumer (**1 mark each**)	Total 3
3(a)	A. name (**1 mark**) B. 1 and C: m (**1 mark**) or N or * D: name or grade (**1 mark**) E. grade or name (**1 mark**)	Total 4
3(b)	One-to-many / m:1 / many to one (**1 mark**) [1:m no marks] *:1 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**)	Total 3
3(c)(i)	studentID name grade houseID STU004 Hakeem 11 HS3 The answer similar to the above two rows: **2 marks (NO INFORMATION LOSS)** Spelling mistakes/additional spaces/case changes **DEDUCT 1 mark**	Total 2
3(c)(ii)	Error Attribute name and houseID (one is enough) appear in both tables. (**1 mark**)	Total 1

A- (4)

4(a)	Maximum usable size of memory = 4GB = 2^{32} bytes (**1 mark**) Maximum Number of different addresses required = 2^{32} (**1 mark**) Number of minimum bits required for an address = 32 bits Answer: Therefore width of the address bus = 32 bits. (**1 mark**)	Total 3
4(b)	NO (**1 mark**) Process is a program in execution (not just an alternative name for a program). (**2 mark**)	Total 3
4(c)	A. Ready (**1 mark**) B: Running (**1 mark**) C: Terminated (**1 mark**) D: Blocked (**1 mark**)	Total 4

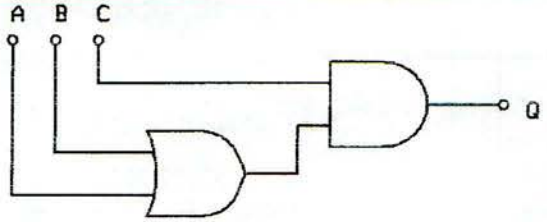
PART B: Essay

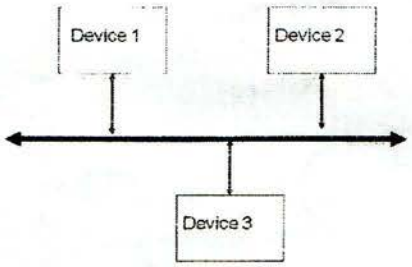
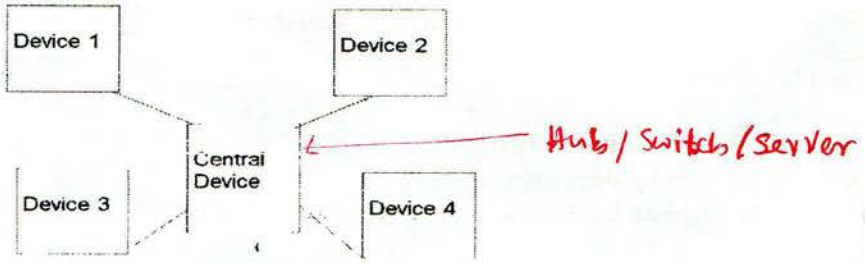
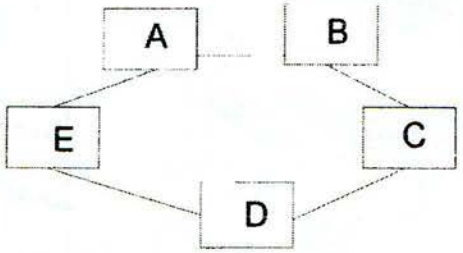
B- (1)

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)** Each correct row with Q=1 will get **1 mark**. (Maximum **3 marks**) Correct table: **1 mark** Note: ***Marks should be given only when the given names for detectors or well defined symbols for detectors are used***. No marks will be given for other cases.	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

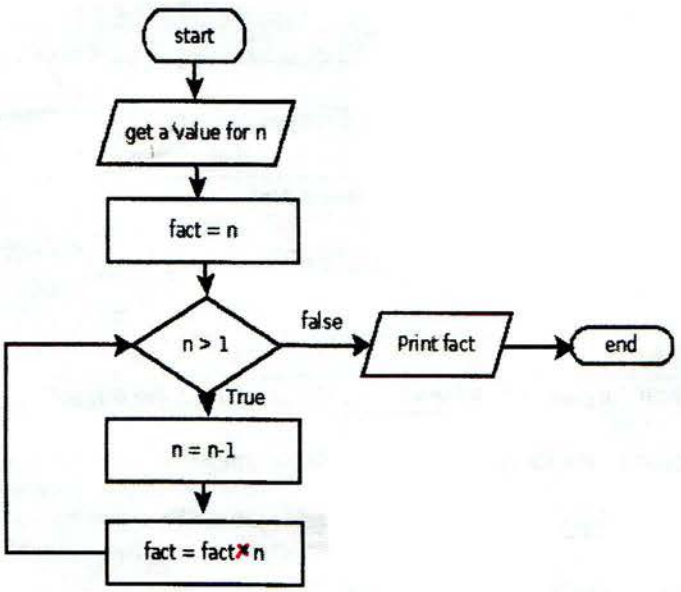
Q = ABC + C(A+B) (According to Scenario)

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 = $\bar{x}yz + x\bar{y}z + xyz$	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)	 **2 or 0 marks** [Only If three marks collect above II]	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)	Application Presentation Session Transport Network Data Link Physical **(Either 0 or 3 marks)**	Total 3

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

B-(3)

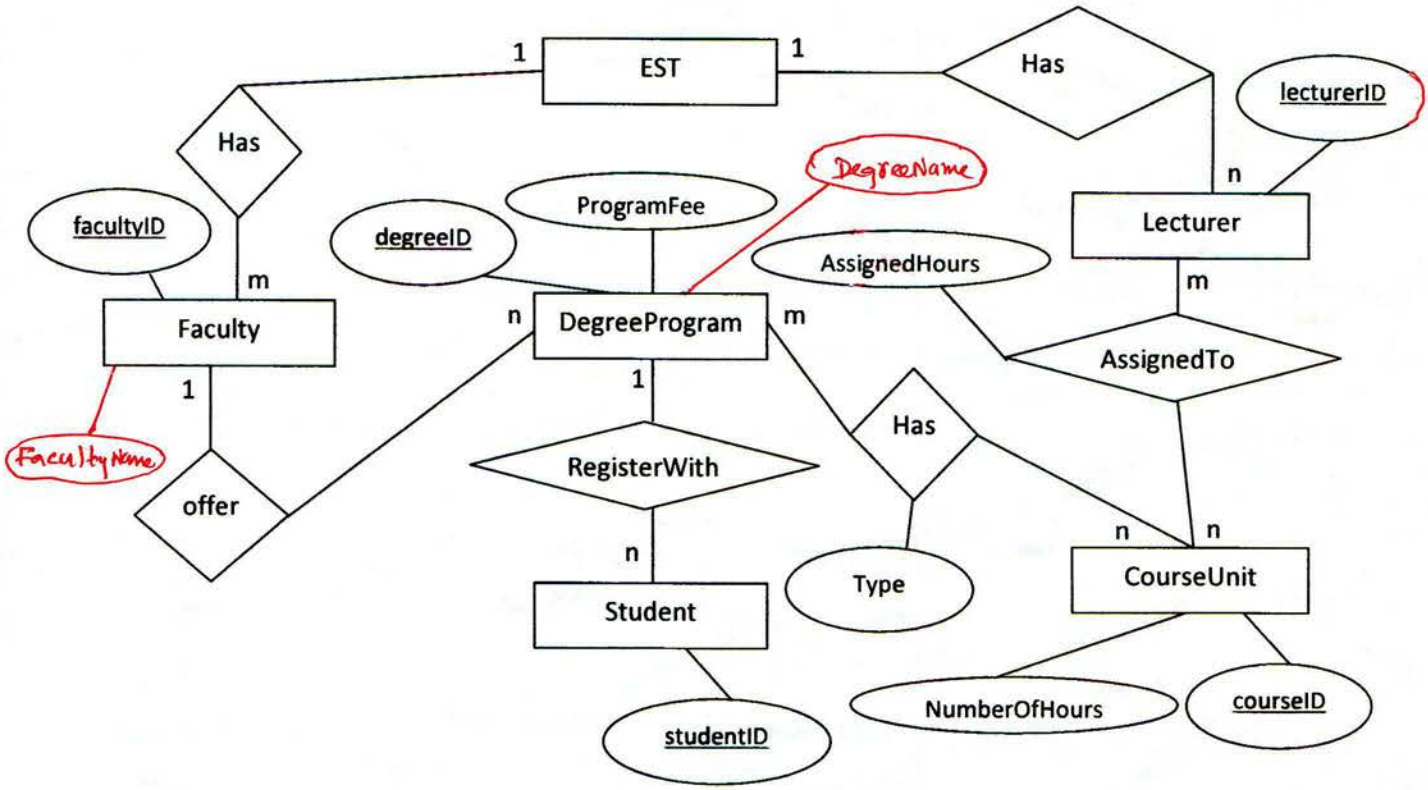
3(a)	The manual process: • **Consumes significant amount** of each employee's **working time.** **(2 marks)** • **Delays the salary increments** of the employees and make them unhappy **(2 marks)**	Total 4
3(b)	Agree. **(1 mark)** To ***reduce the time taken by the Finance expert*** **(2 marks)** to prepare the special report, we can introduce an Artificial intelligence based system to ***replace/assist the Finance expert.*** (2 **mark)** Suggested AI application is ***Expert System*** or ***Agent System.*** Software Agent	Total 5
3(c)	Yes. **(1 mark)** 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, ***it is a service given by the company to its employees in an online mode.*** **(2 marks)** Therefore it is B2E.	Total 3
3(d)	Damage the employee privacy or Abusing company strategic information by a competitor or Any other negative impact	Total 3
4(a)(i)	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) Type of x is string. **(1mark)**	Total 2
4(a)(ii)	Open a file named "myfile.txt" to read data (by creating a file object) Assign the file (reference to object) to the variable infile. (**1 mark** for the two steps above) The infile variable type file (object). **(1 marks)**	Total 2

4(a)(iii)	Split the string "a,b,c" by the character "," and Assign the output to the variable a. (1 mark for the two steps above) Type is an array/list (1 mark)	Total 2
4(b)(i)	 Matches any flow charts	Total 5

	Start and End **(1 mark)** Correct decision making symbol **(1 mark)** with the correct decision Correct output **(1 mark)** For the correct logic **(2 marks)** ***Variation: the given number can be kept in a variable.*** ***Note: Any variations contact Controllers.***	

4(b)(ii)	def fact():
	n = int(input("Enter a number "))
	fact = n
	while (n > 1)
	n = n-1
	fact = fact * n
	print(fact)
	
	Correct function definition: **1 mark**
	Correct repetition: **1 mark**
	Correct output: **1 mark**
	Correct implementation of the flowchart: **1 mark**
		Total 4

5	Refer ER diagram. Each entity with its primary key – **1 mark (5 marks)** Each relationship with correct cardinality and attributes– **1 mark (6 marks)** Each attribute except primary key– **1 mark (4 marks)** Entities and primary keys: Faculty – facultyID Lecturer – lecturerID DegreeProgram – degreeID CourseUnit – courseID Student -studentID Different names are allowed if the correct scenario can be obtained from the ER diagram.	Total 15



4 attributes should be:

DegreeName
FacultyName
ProgramFee
NumberOfHours

OR

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

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