

**G.C.E. (A/L) Examination – November 2015**

**Conducted by Field Work Center, Thondaimanaru.**



**In Collaboration with the Zonal Education Office, Jaffna**

**Information & Communication Technology (ICT)**

**Grade - 13 (A/L) 2016**

**Part - II**

**Time: 3 Hours**

**Part II - A Structured Essay**

**Answer all the questions**

**1.**

(a) Write down well-formed HTML code segments for the following results rendered on a webpage.

(i) Tom & Jerry

(ii) <html >

(b) Write down HTML code segment to insert an image, named “bird.png”, on a web page and assume that the alternate text is “birds”.

(c) Fill in the following HTML code segment written to render the table given below.

Subjects	Marks	
ICT	78	98
Physics	90	76

```
<.....1.....border = "1" >  
<.....2.....>  
  <th> Subjects </th>  
  <th .....3.....> Marks </th>  
<.....4.....>  
  
<tr>  
  <td> ICT </td>  
  <td> 78 </td>  
  <td> 98 </td>  
</tr>  
  
<tr>  
  <td> Physics </td>  
  <td> 90 </td>  
  <td> 76 </td>  
</tr>  
<.....5.....>
```

- 1. ....
- 2. ....
- 3. ....
- 4. ....
- 5. ....

2. The table below stores details of students and the overall grade each student obtained in different modules. The table has a composite primary key (StudentID, ModuleID).

**Results**

<u>StudentID</u>	StudentName	<u>ModuleID</u>	ModuleName	Grade
S001	Smith	M01	Java	A
S001	Smith	M02	Databases	B
S002	Ford	M01	Java	B

(a) Which Normal Form does the above table violate and why?

(b) Normalize the table up to the normal form identified in question (a).

(c) Draw an ER diagram for the entities you obtained in question (b)

(d) Write down type of the cardinality in the ER diagram drawn in (c) and justify your answer.

3. Consider the following python program.

```
# fib.py
```

```
def call():
```

```
    a, b = 0, 1
```

```
    while b < 10:
```

```
        print (b, end = ' ')
```

```
        a, b = b, a + b
```

```
call()
```

(a) Write down the followings in the table referring to the python program given above.

	Column A	Column B
(i)	Identifiers	
(ii)	A conditional statement	
(iii)	Program comments	
(iv)	File name of the python program	
(v)	A function call	
(vi)	Variables	
(vii)	The statements repeated by the loop	
(viii)	Arithmetic operator	

(b) Consider the following python program.

```
n = 1
sum = 0
while n <= 10:
    sum = sum + n
    print (sum, end= ' ')
    n = n+1
```

Rewrite this code using a 'for' loop again.

(c) Briefly explain the following e-commerce services with appropriate examples.

	Services	Explanation
(i)	B2C	
(ii)	C2C	
(iii)	G2C	

4.

(a) Write down  $17_{10}$  and  $(-6_{10})$  in one's complement 8-bits method. Show your calculations.

(b) Use one's complement 8-bits method to add numbers  $17_{10}$  and  $(-6_{10})$ . Show your calculations.

(c) Write down the names of the phases of System Development Life Cycle (SDLC) for each of the following descriptions.

	Description	The phase of SDLC
(i)	Making minor changes to hardware, software, and documentation to support system's operational effectiveness.	
(ii)	Checking to ensure that the newly developed system meets user requirements.	
(iii)	Gathering user requirements.	
(iv)	Studying the limitations and problems of the present system.	

(d) The following sentences are regarding operating system. Write down suitable words from the list given below.

	Description	Suitable Words
(i)	A program in execution.	
(ii)	A process can be swapped temporarily out of memory to a backing store and then brought back into memory for continued execution.	
(iii)	Increases CPU utilization by organizing jobs so that the CPU always has one to execute.	
(iv)	To obtain better memory-space utilization, a program is not loaded until it is called.	

**Lists:** [ Multi-programming, context switch, swapping, scheduling, Dynamic loading, Process, memory, operating system, process control block (PCB) ]

**Part II - B Essay Questions**  
**Write down any four questions only**

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1.

Three people take part in an electronic voting, A, B, and C. Each has a button that provides a logical input to a circuit. The input is 0 (vote against) or 1 (vote for). A logic circuit is to be designed to determine the **majority vote**.

- (a) Draw a truth table to represent all voting outcomes.
- (b) From the truth table, derive a Boolean expression without simplification.
- (c) Simplify the Boolean expression obtained in (b). Show all the Boolean Laws clearly.
- (d) Draw a logic circuit to implement the voting mechanism using AND, OR and NOT gates only.

2.

The 'Sweet Treat' company is sells sweets and cakes to the public. The proprietor is very keen on baking and specializes in making homemade sweets and cakes for sale in the shop. As well as making a lot of the confectionery sold in the shop, the proprietor also buys sweets and some cakes from suppliers to increase the range of products for sale.

The proprietor keeps records of the quantities of stock he has on hand. The stock includes raw ingredients for his baking, and also the sweets and cakes he buys from suppliers. Once a week the proprietor checks the stock to dispose of anything that is past its 'sell by' date. He also checks to see if any raw ingredients or any pre-made sweets and cakes need to be ordered from the suppliers. The proprietor orders supplies on a 'Cash on Delivery' basis, so all deliveries are paid for immediately they arrive.

At the end of each day the proprietor checks how many of each homemade item have been sold. He keeps a record of these sales, and uses this to decide how many of each cake or sweet to make for the following day.

- (a) List the processes, data stores and the external entities that you would include on a top level data flow diagram (DFD) of the Sweet Treat company [No need to draw DFD].

3.

- (a) What is the difference between a syntax error and a run-time error?
- (b) A health care company is planning to create a mobile application to indicate Body Mass Index (BMI), so that their patients can work out if they are a healthy weight for their height. The formula used for this calculation is:

$$\text{BMI} = W / H^2$$

Where:

BMI = Body Mass Index, H = Height (measured in metres) and W = Weight (measured in kg)

- (i) Write a pseudocode to calculate the BMI using the formula given above.
- (ii) Draw a flowchart in which the input variables are H and W, and the outputs are BMI and Category; the following data is used to determine Category.

BMI	Health Category
Less than or equal to 18.5	Underweight
Greater than 18.5 to 25.0	Normal
Greater than 25.0 to 30.0	Overweight
Greater than 30.0	Obese

**4.**

A University has adopted a personal identity card (**PID**) system to improve security and to restrict access to certain **groups** of people (such as students, teachers, professors, secretaries, managers.etc.) and at certain times and dates. A person is issued a PID card as soon as they become part of the University community (either employed or on a course of study). Each person belongs to only one group which determines what buildings they can access.

To enter a building, a person (each having a unique personID) must have permission which is established when their PID card is swiped through a PID card reader outside the **building** they wish to enter. A **PID card reader** is located outside the door of a building users wish to access. Permission is granted only if their access credentials are successful. If access is allowed, the captured data is logged, recording the date, personID (from the PIDcard) and the PIDreaderID.

(a) Draw an ER diagram of the above scenario. State the following.

- Cardinality expressed as either one-to-one, one-to-many or many-to-many.
- Primary keys and attributes.
- Any assumptions you made.

**5.**

(a) Write down the major differences between ADSL and ISDN.

(b) Explain briefly the Round Trip Time (RTT).

(c) Compare and contrast star and bus topologies with the help of suitable diagrams.

(d) Write down three differences between peer-to-peer (P2P) and client-server network models.

**6.**

e-driving license project plan is to provide new smart cart driving license instead of using traditional vehicle driving license system in Sri Lanka. This new driving license would contain the details such as photograph, name, address and blood group of driver. These details would be seen by the traffic police officers. Other details such as fingerprint, accident history done by the driver on roads, and fine are stored in e-driving license with the help of electronic chip technology. These details are necessary to protect from unauthorized people. Police officers serving on roads are accessible to read these details with the help of wireless technology. These details will be connected with the centralized database in Colombo.

(a) Write down two functional requirements of this proposed computerized system.

(b) Write down any three ways that the police officers or department of traffic may legally regulate drivers by using new e-driving license.

(c) State two possible advantages that the department of traffic, Sri Lanka would obtain by introducing this new e-driving license.

(d) Except the chip technology, write down two card technologies that would be used for data storage, machine reading and information encoding.

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