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Third Term Evaluation Test - 2021				
Grade 13				
Information and Communication Technology - II		Time- 03 Hours		

Part A – Structured Essay

- Write the answers to all the questions in this paper.

- Draw the desired output from the code below when rendering with a web browser.
(03 marks)

<pre> <!DOCTYPE html> <html><body> <h1>Login form</h1> <form action="/Login_page.php"> <fieldset> <legend>Personalia:</legend> Name: <input type="text" id="fname" name="fname">

 Password: <input type="password" id="pwd" name="pwd">

 <input type="submit" value="Submit"> </fieldset> </form></body></html> </pre>	
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- What happens from the code segment `<form action = "/ Login_page.php">` in the code above?
(1mark)

.....

.....

- What is the output of following PHP code segment? (mark 1)

<pre> <?php function sum (\$x, \$y) { \$z = \$x + \$y; return \$z; } echo "5 + 10 = " . sum(5,10) . "
"; ?> </pre>	
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- Consider the following rules of Cascading Style Sheet.

```

p{color: red;}
.blue{color:blue;}
#green{color:green}
p.pink{color:pink;}

```

Consider the following web page created by including the above Cascading Style Sheet rules.

<pre> <body> <p> Rathnavali BV 1 </p> <p class="blue"> Rathnavali BV 2</p> <p class="blue" id ="green"> Rathnavali BV3</p> <div> <p> Rathnavali BV 4</p> <p class="pink"> Rathnavali BV 5</p> </div> </body> </pre>	<p>What color do each of the following texts on this web page display when viewed by a web browser? (1/2 *5 ලකුණු)</p> <p>Rathnavali BV 1.....</p> <p>Rathnavali BV 2.....</p> <p>Rathnavali BV 3.....</p> <p>Rathnavali BV 4.....</p> <p>Rathnavali BV 5.....</p>
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- v. The following PHP code intends to add data to the ‘tid’ and ‘name’ fields in the ‘teacher’ table in the rbvDB MYSQL database. The username and password to access rbvDB are ‘minda’ and ‘@RBV’, respectively. Fill in the blanks and complete the PHP code.

Assume that the following record should be included in that table. (1/2*5 marks)

tid	name
T001	Mr. N.S.Thilakasiri

```

<?php
$servername = "localhost";
.....
.....
.....
$conn = new mysqli($servername, $username,$password,$dbname);
if ($conn->connect_error) {
die("Connection failed: " . $conn->connect_error); }
else{   echo "Connected successfully";}

$sql=.....
.....

if ($conn->query($sql) === TRUE) { echo "New record created successfully";}
else {echo "Error: " . $sql . "<br>" . $conn->error;}
.....
?>

```

2.

A. For phrases 01 to 05 related to commerce, match the most appropriate item in the list of words below. (Government to Employee (G2E), traditional market, As a subscription revenue model, Social Commerce, payment gateway, Government to citizens (G2C), Virtual Store Showroom, content provider, Virtual community, Information Broker, Purchase in batches, online market) (marks 1 *5)

I. This is a place where buyers and sellers physically interact, exchanging goods and services for money.

.....

ii. Users pay a regular fee for full access to a business website.

iii. This is an e-commerce subset that uses social media to buy and sell products and services online.....

iv. This facilitates secure payment transactions by exchanging information between e-commerce applications and back-end financial services providers.....

v. Renewal of Vehicle Revenue License using the Online Vehicle Revenue License Service provided by the relevant Government Offices.....

B. Consider the following Python code.

```
fruits = ["apple", "banana", "cherry", "kiwi", "mango"]
newlist = [x for x in fruits if "a" in x]
print(newlist)
```

i. What is the output of this program? (01 mark)

.....

ii. Write a different Python program for the list of fruits to get the above same output. (04 marks)

.....
.....
.....
.....
.....
.....

3.

- A. Fill in the blanks in the following sentences related to computer system. Match the most appropriate item in the list provided.

{multi co-processor , SDRAM,SRAM, DRAM, sequential access, random access, Network computer, cache memory, computing, cloud computing}

- i. A processor that has several circuits that can act as a processor within one processor is called a
- ii. A random access memory that works in cooperatively with an external clock
- iii. The method is used to access the data on a traditional magnetic hard drive.
- iv. A type of RAM created from flip-flops
- v. is a network of computers that work together to accomplish a difficult task on a single machine.

- B. If the following statements regarding computer networking are correct, mark the correct mark and if incorrect, mark the wrong mark

- i. The network layer in the OSI reference model contributes to communication from source to destination.
- ii. The IP address 10.0.0.1 is a Class A address.
- iii. Data transmission speed in guided media are higher than in non-guided media and less interference than in non-guided media.
- iv. You need to create 16 subnets with C class Internet protocol. After the creation of this subnet, the subnet mask is 255.255.255.240.....
- v. Only the amplitude and frequency are changed when using the frequency modulation technique.....

4. Shehani is creating a Pascal program on a computer with a single processor and opened the zoom application in a web browser to participate in an online lesson on the subject of IT.

- A. At one point, Pascal noted in the Process Control Block that the program had been changed to swapped out and blocked state from blocked state.

- i. What could be the reason for that? (01 mark)

.....

- ii. What could be the location of Pascal's process at that point? (01 mark)

.....

- B. The size of one block on a disk is 8KB. The diagram below shows the status of a video file starting with the directory entry 501 of the file allocation table

FAT Table

Directory Entry	
500	503
501	500
502	
503	504
504	-1
505	

1. What is the value of the directory information at the end of this file? (01 mark)
.....
2. The size of this file increased by 16 KB after editing. Then what are the changes that need to be made in FAT using only these given blocks? (02 marks)
.....
.....

- C. The length of a virtual memory address on a byte addressable computer is 16 bits. Consider the size of the physical memory of this computer as 32 KB and the size of the page as 2KB.

- i. The virtual address of the 16 bits above consists of page numbered bits and offset bits, respectively. How many bits does this computer need to have to represent the offset? (1 mark)
- ii. How many bits of address are needed to store the page number on this computer? (1 mark)

At some point on this computer, the page table of the process is as follows.

Page No	Frame No	Yes/No
0	5	1
1	0	0
2	0	0
3	6	1
4	3	1
5	0	0
6	7	1
7	0	0

Virtual address on page 0 is **0 to 2047** and page 1 is **2048 to 4095** and so on. The Yes / No bit indicates the validity of that line.

Suppose this operation requires a virtual address **0100 0000 0000 0100**.

- a. Which physical address does the above virtual address correspond to? (1 mark)

.....

- b. Explain why this is happened. (02 marks)

.....

.....

.....

- c. Assume that the virtual address 0001 0000 0000 0000 1111 was needed.

As a result of the processes that the operating system started to fulfill that requirement, page number 06 in the table of pages above yes/ no bit changed from 1 to 0. What is the 15-bit physical address that the 0001 0000 0000 1111 address should match?

.....

Part B – Essay

Answer any *four* questions only.

1. A special computer system has been developed to predict a fall of a wicket during T20 World Cup matches. The following factors are considered for the above prediction.

Number of fallen down wickets (**A**), the scores to be taken (**B**), Scores to be taken per over (**C**). The relevant Boolean values are given below.

Number of fallen down wickets more than 5	Boolean Value 1
The total number of scores to be taken is more than 50%	Boolean Value 1
The scores to be taken per over more than 8	Boolean Value 1

- If the number of fallen down wickets is more than 5 and the scores to be taken is more than 50 % of the total score, an alert bell (F) about the breakdown of the wicket will ring.
- Further, the score to be taken is more than 50 % of the total score and the scores to be taken per over is more than 8, an alert bell(F) ring.
- In addition, in all three instances, the alarm bell (F) rings when the Boolean value is 1.

A. Considering the above scenario, construct the relevant truth table for the system.

B. Using a Karnaugh map, derive a simplified sum-of-products (SOP). Expression for the function of the alert bell.

C. Using a Karnaugh map, derive a simplified product-of-sums (POS) expression for the function of the alert bell.

D. Of the two expressions you obtain in (B) and (C) above, which expression is better to implement a more simplified circuit?

E. Explain your answer.

- 2.** Due to the current corona pandemic situation, the school has decided to expand the computer laboratory facilities. According to that, there are 3 laboratories, a separate lab for 6-9 classes, separate lab for 10-11 classes, a separate lab for 12-13 classes as well as another separate lab for teachers is also given. Available resources in those laboratories are given in the table below.

Laboratory	No of computers	Printer Type	Software Server
6-9	25	-	-
10-11	31	Network printer-01	Student Information System (SIS)
12-13	40	Network printer-01	-
Teacher Lab	42	Network printer-01	Teacher Information System (NEMIS)

The school proposes the following when implementing networks for the laboratories:

- A Local Area Network (LAN) should be created for each laboratory.
- All networks should be connected to each other through the Teacher lab.
- All computers should be given efficient internet connection with the help of a Domain Name System (DNS) and Proxy servers.
- Sri Lanka Telecom to supply the internet connectivity to the Teacher Lab.
- Protect the entire network with a Firewall.

- i. The IP address block 192.168.15.0 / 24 is received to create this network, which allocates IP addresses to create four subnets. Write down how to allocate IP addresses to each lab using the table format below.

Laboratory	Network ID	Broadcast ID	Subnet mask	Usable IP address range
6-9				
10-11				
12-13				
Teacher's Lab				

- ii. Write down the advantage of using a DHCP server to dynamically assign IP addresses to this network.

3. A.

Consider the following description related to the information of an insurance company.

A person may have one or more cars. A person is uniquely identified by his or her personal Identification Number (PersonID). A person also has a name consisting of a surname and initials.

Each person has an address. One person can own one or more cars. But there is only one owner per car.

Also, a car is uniquely identified by its car number (CarID). The car also has a year and a model.

ReportNumber is used to identify an accident. Also, every car accident has a location and a date.

One person can have one or more accidents. Also, a single accident can involve many people.

Note: Use only the relevant words in the above description when drawing the Entity Relationship (ER) diagrams for the following questions

- Draw a **Entity Relationship diagram (ER)** for the above description.
- Extend the ER diagram drawn in (i) above to include the DamageAmount for each accident.
- One car may be involved in one or more accidents. Also, a single accident can involve many cars.

Extend the ER diagram in (iii) above to include this description.

B.

Below is a PersonInsurance table showing the types of insurance that each person has obtained.

It is assumed that this automobile insurance is not based on the value of the vehicle but on an insurance package scheme. There is a definite value for each type of insurance. The value of the Gold, Silver and Bronze packages is 5000000, 3500000 and 2500000 respectively. Note that the primary key in the PersonInsurance table is PersonID and Insurance.

PersonInsurance Table

PersonID	InsuranceID	InsuranceType	InsuranceValue
P001	1	Gold	5000000
P002	3	Bronze	2500000
P003	1	Gold	5000000
P002	2	Silver	3500000
P001	2	Silver	3500000

- Write an SQL statement to display the number of people who have purchased Gold type insurance
- In which normalization the above table exists? Justify your answer.
- Convert the above table to the next normal form. (It is not required to write the data in the tables derived in next normal form.)

4.

A. A Python program must be created to output the product of even numbers in a given positive number sequence. The size (n) of the numeric sequence is determined by the user running the program. For example, if the number is 5,2,1,2,16 in sequence, then 80 should be given as the output.

- i. Draw the relevant flow chart for the above program.
- ii. Write the relevant Python code to the above flow chart.

B. Consider the following Pseudo Code:

```
Input list(L)
Take length of list(n)
x=0
Do while x < n then
    If L[x]<0 then
        Continue
    If L[x] >8 then
        Break
    x=x+L[i]
Loop while
Display x
```

- i. What would be the output of the above program, if the below list has given as input?

L = [1,-2, 4, 5, -8, 15, 2]

- ii. What is the purpose of the above program?

5. Hotel Dunhida is a tourist hotel that offers accommodation to tourists. Tourists can inquire about booking a room at the hotel by telephone from the hotel's assistant manager. He then takes the **room reservation document** and checks the situation to see if there are any rooms available for the current inquiry and answers the query. If the type of room requested by the customer is free and the customer intends to reserve the room, the **Assistant Manager** obtains the customer's personal information, inserts personal information and a reservation number in the reservation document so that no one else can reserve the room, and assigns the customer a reservation number. It is also the duty of the Assistant Manager to prepare the bill for this reservation and include it in the bill file.

When the tourist arrives at the hotel, he first meets the receptionist. The customer gives the reservation number he received to the receptionist, who checks the reservation number for that number, takes the relevant bill from the bill file and gives it to the customer.

The customer pays the bill and the payment to the cashier, who accepts the payment and hands over the updated payment bill to the customer to complete the transaction. The cashier then inserts a copy of the bill into the **day's income file**. At the end of each day, the cashier prepares a report of the day's income from the copies of the bills in the day's income file and sends it to the hotel owner.

Using standard symbols draw the **Level 1 Data Flow Diagram** for the above system.

6. A.

"Mala Furniture" is a furniture store in your city. It sells furniture to consumers. Due to the COVID 19 epidemic, the owner started selling his products online through his own web portal in addition to selling goods to customers who came to the store.

- i. What is the e-commerce business type started by the owner of this business?
- ii. What type of business model did this business use before COVID 19?
- iii. The owner of "Mala Furniture" has now decided to conduct his business online only. That is, what type of business model will this business use in the future?
- iv. The furniture required for the "Mala Furniture" business is procured from a large-scale furniture business called "Neela Furniture". Mention the e-commerce business type between the two and briefly state the reason for your answer.
- v. If there is an opportunity to advertise other businesses on the "Mala Furniture" website, name two revenue models for the Mala Furniture business and briefly explain them.
- vi. Mention two methods that can be used for online payments in the above e-business.
- vii. Mention an opportunity to use intelligent agent technology for the efficiency of this business

B. Consider the following description of Artificial Intelligence Agent Systems.

The User communicates with Agent A. Agent A is a chat bot agent. Agent A provides the service Y and Agent B provides the service X. The Facilitator Agent is an agent who coordinates and facilitates all agents. At some point after a communication has taken place between the user and Agent A, Agent A requests the service X and sends a message to the Facilitator Agent. The Facilitator Agent then forwards the request sent by Agent A to Agent B. Agent B then forwards the response to the Facilitator Agent, and the Facilitator Agent forwards the response to Agent A. Agent A then communicates with the user.

- i. Draw a simple diagram for the artificial intelligence agent system described above. Name the important elements in your diagram.
- ii. "The above agent system is a Multi Agent System." Do you agree with this statement? Give a reason for your answer.
- iii. Identify a self-autonomous agent (agent who has no interaction with the user) in this scenario