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Second Term Evaluation Test - 2022				
Grade 13				
Information and Communication Technology - II			Time- 03 Hours	
<small>Rathnavali Balika Vidyalaya - Gampaha. Rathnavali Balika Vidyalaya - Gampaha. Rathnavali Balika Vidyalaya - Gampaha. Rathnavali Balika Vidyalaya - Gampaha.</small>				

Part A – Structured Essay

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

1. a) Following html page shows internal link. When click on the Lesson1 it will move to Introduction of Lesson 1 section of the page. **Fill the blanks of line 6 and line 8** (2 marks)

<p><u>Lesson 1</u></p> <p>Introduction of Lesson 1</p> <p>This is sub topic. 1</p> <p>This is sub topic. 2</p> <p>This is sub topic .3</p> <p>This is sub topic .4</p>	<ol style="list-style-type: none"> 1. <!DOCTYPE html> 2. <html> 3. <head> 4. </head> 5. <body> 6. <a>Lesson.1
 7.
 8. <a>Introduction of Lesson 1 9. <p>This is sub topic.1</p> 10. <p>This is sub topic.2</p> 11. <p>This is sub topic.3</p> 12. <p>This is sub topic.4</p>
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- b) Write HTML code to fulfill the following requirements. (3 marks)

- i. Change the background color of the page as blue.

.....

- ii. Add the comment line to the page as “This is a comment”.

.....

- iii. Add image call “**logo.jpg**” into your page and while the image is not display show the word “office logo” (Imaging the image and the webpage in same location)

.....

- c) Write an efficient **internal CSS** code for following requirements. (2marks)

- Create a CSS class call “para” which only affected to Paragraphs. By using this class change the font color into red and font size into 14px.
- Needs to add background color blue, fonts in Calibri and text are align into left in H1,H3 and P elements in the page.

.....

.....

.....

.....

d) Fill in the blanks to following HTML code to get the given output?

(3 marks)

Registration form

sports details

Choose your sports:

Cricket

practice time :
morning ☐ evening ☐

Remarks :

Submit

ResetAll

```
<html><head><title>Registration form </title </head>
<body>
.....
.....
.....
.....
Choose your sports: <br>
<select name="sports">
    <option .....> Cricket</option>
    <option .....> Net ball</option>
    <option .....> Table Tennis</option>
</select><br>
practice time : <br>
morning <input type=.....name=.....value=.....>
evening <input type=..... name=..... value=.....>
<br><br>
Remarks : <br>
<..... name="comment" > </.....>
.....
<input type=..... name=..... value=.....>
<input type=..... name=..... value=.....>
.....
</body></html>
```

2. A. Match each of the given sentences (i) to (v) related to *computer networks* with the most suitable item from the given list.

List - {Transport Layer, Token ring, Multiplexing, Network Layer, User Datagram Protocol (UDP), Transmission Control Protocol (TCP), Firewalls, Network Switch, Router}

- i. The Internet Protocol (IP) and Address Resolution Protocol (ARP) works on
- ii.is the method used for data transmission in the ring topology.
- iii.could be used to prevent unauthorized access of files on the Internet.
- iv. Most of the online games and video conferencing apps like Skype, Zoom, all use the services of
- v.is used in file transfer when we cannot tolerate the loss of data and receiving the data in correct order is of utmost importance.
- vi.is responsible for end-to-end communication between two devices.

(3 marks)

B. Identify the most appropriate type of cloud service described by the given descriptions and write the relevant term related to the *Cloud Computing terminology*.

DESCRIPTION		SERVICE
1	<i>Rather than keeping files on a proprietary hard drive or local storage device, this service makes it possible to save them to a remote database.</i>	
2	<i>This service provides a platform for creating software that is delivered via the Internet.</i>	
3	<i>This service allows users to connect to and use cloud-based apps over the Internet via a subscription basis using external servers.</i>	

(3 marks)

C. A *feasibility study* is an assessment tool that helps determine if a proposed product, service or business will be successful. It determines whether this project is possible and practical.

Identify two (2) relevant factors should be considered/analyzed in this study.

1. 2.

(2 marks)

D. Madara has decided to use the new technology to her ready-made clothing Business. For that, she thinks to sell her unique ready-made dresses through an Online Store.

She is supposed to deliver the ordered dress items to particular customer addresses once they confirmed their payments through credit card/debit card.

- i. According to the knowledge of your E - Business transaction types, what type of transaction type will occur in this business. **(1 mark)**
- ii. State a facility that provides the ability to maintain a list of items a customer expects to purchase using an e-commerce website..... **(1 mark)**

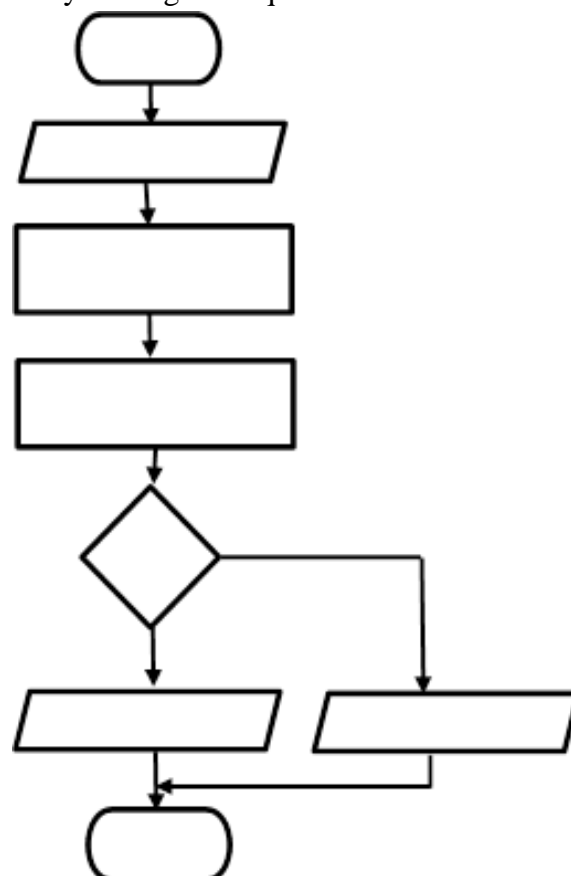
3. a. Need to draw a flowchart for an algorithm that calculates and outputs the area of a circle and the volume of a sphere. Radius of circle and sphere are given as input. (Radius of circle and sphere are equal.)

Note : area of a circle = $22/7 * \text{radius}^2$

Volume of a sphere = $4/3 * 22/7 * \text{radius}^3$

Resultant values should be in ascending order.

Complete the flowchart by writing the required entries for the 5 blank symbols given.



(5 marks)

- b. For a given integer, complete the four spaces in the following Python code to return the integer with the reverse digits.

Note: Integer can be positive or negative.

(3 marks)

```
def solution(x):
    string = str(x)
    if string[0] == '-':

        return .....
    else:
        return .....

print(..... (-231))
print(..... (345))
```

- c. Consider the following python code

```
a1=[0,1,0,3,12]
a2=[1,7,0,0,8,0,10,12,0,4]
def solution(nums):
    for i in nums:
        if 0 in nums:
            nums.remove(0)
            nums.append(0)
    return nums
solution(a1)
solution(a2)
```

Write down the output of the above program.

.....

(2 marks)

4. a) The size of a disk is 8KB. A portion of its File Allocation Table (FAT) at a particular time, is shown below. It gives the blocks of *mycalc.py* file as well.

200	202
201	
202	-1
203	
204	200

1. The last block of the file is indicated by -1.
2. The directory information related to the file (Directory Entry)

Indicates the block number of the first block of the file.

- i. Write down the directory information in the *mycalc.py* file.

.....

(1 mark)

- ii. What is the size of my calc.py file?

.....

(1 marks)

- iii. Assume that *mycalc.py* file has extended upto 16KB. What changes are needed in the FAT for this. Considering the changes re- draw the FAT table.

(2 marks)

.....

- b) In a computer whose virtual memory capacity is 64 KB and a page capacity is 4KB, page 0 has virtual references 0 to 4095. A process with a capacity of 16 KB is run on this computer. The page table of that process at a particular time is shown below.

Page No.	Frame No.	Absent/Present bit
0	100	0
1	111	1
2	101	1
3	110	0
4	001	1
5	010	0
6	000	1
7	011	0

- i. Assume that Virtual memory address 0110 1011 0101 0101 is required. To which physical address will it get transform to?

.....

(2 marks)

- ii. i. How many bits are used for the offset?

.....

(2 marks)

- ii. How many bits are used for the page number of the virtual memory address?

.....

(2 marks)

Part B – Essay

Answer any *four* questions only.

1. An alarm sounds when certain conditions occur in a nuclear reactor. The output Z of a logic circuit that drives the alarm must have a value of 1 if,
- either** Carbon dioxide pressure too low **and** temperature $\leq 300^{\circ}\text{C}$
- or** Water pressure > 10 bar **and** temperature $> 300^{\circ}\text{C}$
- However**, when the water pressure is > 10 bar **and** temperature is $> 300^{\circ}\text{C}$, **if** the carbon dioxide pressure is acceptable level, the alarm signal **will not be sound**.

The input to the system are:

Input	Binary	Condition
P	0	Carbon dioxide pressure too low
	1	Carbon dioxide pressure acceptable
T	0	Temperature $> 300^{\circ}\text{C}$
	1	Temperature $\leq 300^{\circ}\text{C}$
W	0	Water pressure > 10 bar
	1	Water pressure ≤ 10 bar

- Construct the complete truth table for the above scenario. (2 marks)
 - Design a Karnaugh map and map the values accordingly for the above truth table. (4 marks)
 - Using the Karnaugh map derive a simplified SOP expression for the output. Clearly show the loops on the Karnaugh map. (3 marks)
 - Using the Karnaugh map derive a simplified POS expression for the output. Clearly show the loops on the Karnaugh map. (3 marks)
 - Which one of the expressions you obtained in (ii) and (iii) above is more suitable for implement a simplified logic circuit? Briefly explain your answer (3 marks)
- 2.(a.) A University decided to create a small computer network inside the common area of the IT faculty to use internet of their free time. The management of the university provides the following devices to build this network.
- According to the current position university is unable to invest more money. So, you need to design cost effective solution by using given devices.

<i>Device name</i>	<i>No of devices</i>
Deck top Computer	10
Network Interface card	As much as necessary
RJ45 connectors and UTP cables	As much as necessary
Router	01
Proxy server	01

- i. One network administrator says according to the above requirement can't propose Bus topology to this network. Give two reasons for it? (2 marks)
- ii. What is the most suitable network topology for above case? (1 marks)
- iii. University need to protect this network from the external parties from internet and also it is decided to construct the network by using the above network devices only. Draw the *network diagram*, considering the above requirements. (4 marks)

(b.) The university need to build 4 networks for the following faculties. Use **192.168.16.0/25** IP address block to provide the IP addresses to each sub networks. Fill in the following table. (8 Marks)

<i>Sub network</i>	<i>No of Nodes</i>	<i>Subnet mask</i>	<i>Network IP</i>	<i>Broadcast Address</i>	<i>Valid IP range</i>
Art	64				
Management	32				
Technology	16				
Science	16				

3. (a) A company engaged in trading in video CDs Starting an e-commerce website with the aim of expanding their business as much as possible.

- i. What is the e-commerce model of this business?
- ii. What is the e-business type related to this business?
- iii. What is the main e-commerce revenue model for this business?
- iv. For greater customer popularity, this organization decides to present the digitized content for free through a streaming channel.

In addition to the revenue model mentioned in (iii) above, what revenue model will be created with the launch of the new streaming channel?

- vi. Mention one advantage of selling digital content through the digital content channel as compared to selling video CDs in the traditional way.
- vii. This business's e-commerce website creates an e-commerce marketplace for other business people to sell their products. Name a new revenue model for this business as a result of this decision.

- (b) Automatic detection of abnormalities according to individuals' health data and remote medical advice about the Multi Agent Distribution Platform (MADP) multi agent system that provides access a description is given below.

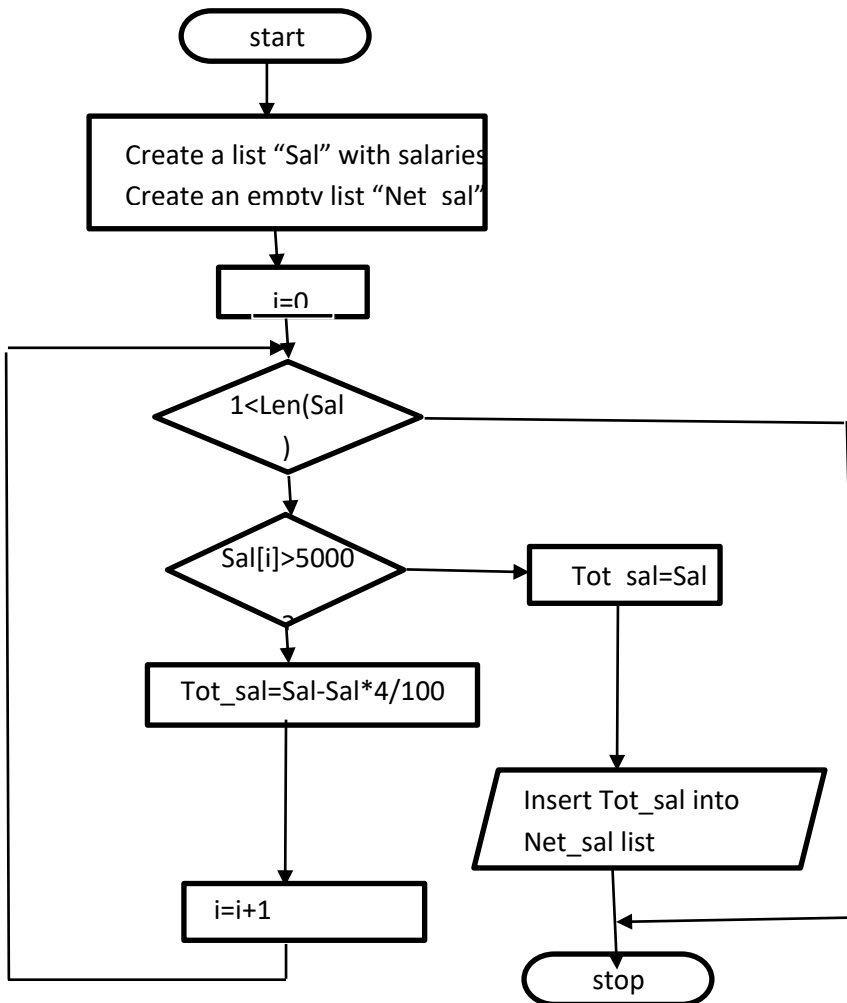
A request made by a person via e-mail or SMS is directed to the User Agent. Then the user agent forwards the delegate job to the medical agent according to the request. Then the medical agent forwards the request to the Resource Agent and the Resource Agent makes the data request to the Knowledge Based Data Server.

After that, the information server forwards the data to the resource agent, and the resource agent notifies the medical agent about the data. The Medical Agent then forwards the notification of the data to the User Agent. The user agent then displays instructions to the user.

- i. Draw a simple agent diagram for the above multi-agent system. Name the important elements in your diagram and explain the relationships between them.
 - ii. Write down one advantage of the above multi-agent system.
 - iii. Write down one challenge to be faced in relation to information and communication technology While building a sub-agent above.
4. (a) Suppose the marks of n students in grade 12 are in a list M. Assuming the list M and integer i are inputs. Draw an algorithm using either a flowchart or pseudo code to compute and output the average marks of students in M whose mark is greater than 50. (5 marks)
- (b) Following are the salary amounts received by the employees of an organization. The organization deducts 4% of the salary of employees earning more than Rs.5000 for the Employees' Provident Fund

Name of the Employee	Salary
Wijesiri	5000
Ramanayake	7000
Samaraweera	4000
Mallikarachchi	10000
Senanayake	12000

Consider the algorithm presented in the flowchart shown below regarding the above scenario.



- Write down the output in the above flowchart. (2 marks)
- What happens if $i=1$ at the start of the above flowchart? (2 marks)
- Build the Python program to implement the algorithm expressed in the flowchart. (6 marks)

5. A. "Rydmí" is a food order delivering company and has decided to create an information system for the progress of the company. The following information will be stored in their database.

Any user is able to place an order. When placing an order, it takes the customer's phone number, name and gives a unique customer number to each customer. When an order is placed, a unique order number, Order type, date and time are recorded. One order is placed by one customer and also one customer can place multiple orders.

One order can include several food items such as egg rolls, Koththu, hoppers...etc, and the same foods can be included in several orders. When placing an order, the quantity should be entered. Each food has a unique food number (FoodId), name and price. Payment for an order is made by cash or cards, where the payment number, total amount, and payment method are recorded.

Draw *the Entity Relationship Diagram (ER)* related to the database design for the above system.

B. Answer the questions given below considering the Student table.

<u>StudentCode</u>	Name	Town	Province
S001	Dinith	Colombo	Western
S002	Achila	Galle	Southern
S003	Janaka	Kandy	Central
S004	Sumudu	Colombo	Western

- Write the relevant SQL code to retrieve only the name and student code (StudentCode) of the students coming from Colombo.
- Write the relevant SQL code to retrieve the number of children in the western province.
- At which normalization form does the above table exist? Give reasons for your answer.
- Normalize the above table up to third normal form.

6. A university starts a Post Graduate program (PGD) for internal graduate students. To apply this PGD, student needs to follow the following steps.

Student need to request application form from the PGD counter. Then the Clark in the PGD counter issue the application form by asking student no. Then student returns the filled form to that counter it will store inside the PGD application file and issue a registration card to the student.

After the dead line of the application process, in-charge lecturer of PGD collects the all applications from the Clark of the PGD counter and start the selection process. He selects the qualified applications and put into qualified file and sends the notifications to the qualified students.

Then Clark get the details of qualified students and prepare the calling letter. Student who qualified for the PGD needs to collect their calling letter by giving their registration card to the PGD counter. When the Clark issuing the calling letter, he updates the qualified file by adding issued letter details.

- Draw a *level 01 DFD* according to the SSADM rules.
 - Students at the university say that a commercial off the shelf software is ideal for automating such a system.
- Do you agree with this statement?
- Describe one reason for it?