අධ්‍යාපන පොදු සහතික පත්‍ර(උසස් පෙළ) විභාගය - 13 වසර : 3 වන වාරය - 2022
General Certificate of Education (A/L) Examination - Grade 13 : Term 3 - 2022

තොරතුරු හා සන්නිවේදන තාක්ෂණය II Information & Communication Technology II	20	E	II	පැය තුනයි Three Hours

Part A

Answer all four questions on this paper itself

1.

a) I) Fill in the blanks of the following HTML code to get the output given below.

```
<H1>Table of Contents</H1>
<P><A ……>Introduction</A><BR>
<A ……>Some background</A><BR>
<A ……>On a more personal note</A><BR>
the rest of the table of contents
the document body
<H2 id="section1">Introduction</H2>
section 1
<H2 id="section2">Some background</H2>
section 2
<H3 id="section2.1">On a more personal note</H3>
section 2.1
```

Table of Contents

Introduction
Some background
On a more personal note
the rest of the table of contents the document body

Introduction

section 1

Some background

section 2

On a more personal note

section 2.1

b) The relevant HTML code(incomplete) is given below. Fill in the blanks in it in order to get the required output using stylesheet.

A/L

AL ICT

Introduction to ICT

Advanced level ICT subject number 20

Please refer the php slide

```
<html> <head>
<…… >
.ct{color:green;}
p,……{text-align:center;}
……{color:red}
</…… ></head>
<body>
<h1 ……="color:Orange;"> A/L </h1>
<h1 ……="ct"> AL ICT </h1>
<p>Introduction to ICT</p>
<p id="net">Advanced level ICT subject number 20</p>
<blockquote> Please refer the php slide</ blockquote>
</body> </html>
```

c. The following PHP code is intended to add data entered to the below form into “corder” table in the My SQL database called “Inventory”.
Complete the PHP code segment by filling the blanks.

```
<form method="POST" action="newSendOrder.php">
<pre><label>Cutomer No:</label>
<input type="text" name="CustNo"><br>
<pre><label>Item No   :</label>
<input type="text" name="ItemNo"><br>
<label>Quantity  :</label>
<input type="text" name="Qty"><br><br>
<input type="submit"  class="button" value="Send Order"/>
<br><br>
</form>
<?php
$conn = new mysqli("localhost", “root”,”abc”,_________________);
if (_________->connect_error) {
die("Connection failed: " . $conn->connect_error);
//die( ) function is used to display a message and exit the script.
}
else{
        echo "Connected successfully";}
$id = _____________________;
$item=_____________________;
$qty=_____________________;
//Insering data to tables
$sql = "INSERT INTO corder(cid,itemno,quantity) VALUES('$id','$item','$qty')";
if ($conn->query(_____________) === TRUE) {
        echo "New record created successfully";}
else {
        echo "Error: " . $sql . "<br>" . $conn->error;}
$conn->close();
?>
</body></html>
```

d. Write the out for the following php code

```
<?php
$colors = array("red", "green", "blue", "yellow");
$n=count($colors);
for ($x = 0; $x<$n; $x++) {
  echo "$colors[$x]"." / ";
}
?>
```

e.
Write the out for the following HTML code

```
<html>
<body>
<fieldset><legend>Details</legend>
Which taxi do you require?
<p><label> <input type="radio" name="taxi" required value="car" checked> Car </label></p>
<p><label> <input type="radio" name="taxi" required value="van"> Van </label></p>
<p><label> <input type="radio" name="taxi" required value="tuktuk"> Tuk Tuk </label></p>
</fieldset>
<fieldset><legend>Extra</legend>
<p><label> <input type="checkbox" name="extras1" value="baby" > Baby Seat </label></p>
<p><label> <input type="checkbox" name="extras2" value="wheelchair"> Wheelchair Access
</label></p>
<p><label> <input type="checkbox" name="extras3" value="tip"> Stock Tip </label></p>
</body>
</fieldset>
</html>
```

2.

a. Fill in the blanks with a suitable **deployment method** considering GIT exam implementation as an online exam.

i. GIT exam is an online exam for both paper 1 and paper 2 for all school

……..

ii. GIT exam is an online exam for only paper 1 for all schools

……

iii. GIT exam is an online exam for both paper 1 and paper 2 for some selected schools only

……..

b. By considering **cloud computing** write either **True or False** in the blank for each of the following statements.

i. The Foce.com and windows Azure are examples of PaaS ……

ii. Availability and Large Network Access are the features of cloud computing …….

iii. In IaaS, the users receive computing resources like software or hardware tools virtually over the internet……..

c. Fill the blanks in the following statements with suitable words from the given list of words.

i. …….. Mainly deals with framing, error control and flow control.

ii. ……in networks is the structure or pattern in which each and every node in the network is connected.

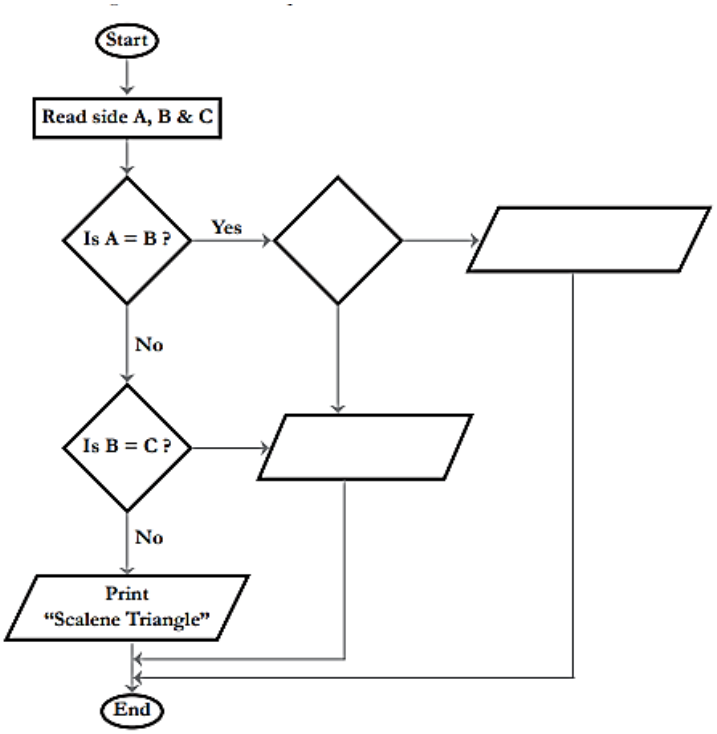
iii. Public key cryptography is a ..... cryptosystem

iv. The ……. can provide the dynamic allocation of the IP addresses.

List of words:{DNS server, DHCP Server , Topology, Data link Layer, Asymmetric, Network Layer, Symmetric}

3.

a. Lengths of three sides of a triangle A,B,C are given as input. The following flowchart finds if the triangle is isosceles, equilateral, or scalene. Some boxes in the flowchart are filled for you, fill in the rest of the details.



Hint:
In an equilateral triangle, three sides are equal.
In an isosceles triangle, two sides are equal.
In a scalene triangle, three sides are not equal.

b. Complete the blanks in the following python program to sort list to ascending order using bubble sort.

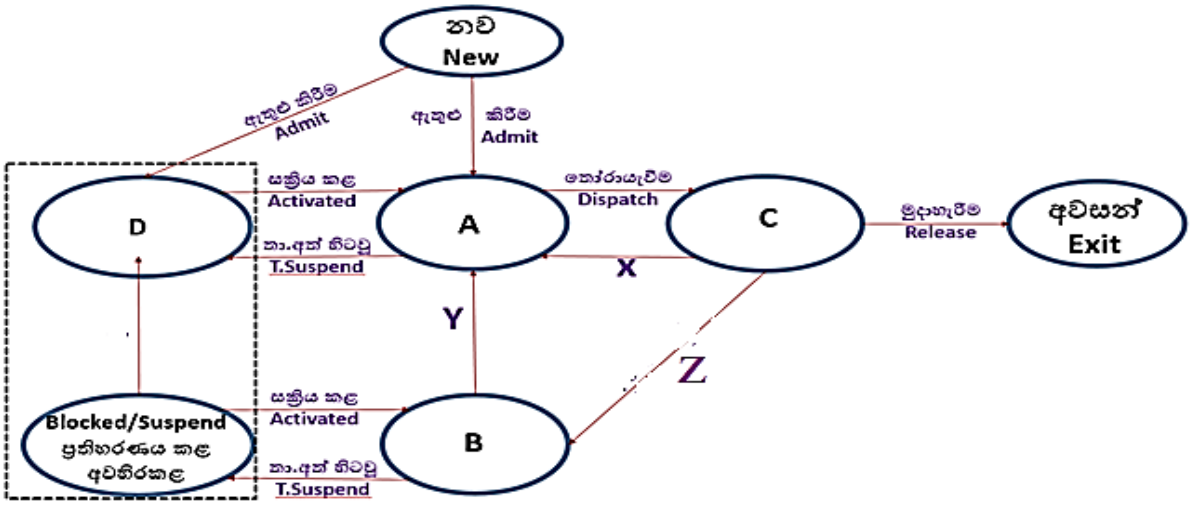
```
def bubbleSort(array):
    for i in range(len(array)):
      for j in range(0, len(array) - i - 1):
        if array[j] ….. array[……..]:
            temp = array[j]
            …….. = array[j+1]
            array[j+1] = ……..
    return array
```

c. Write output of the following python code

for i in range(6, 0, -1):
  for j in range(0, i - 1):
  print("*", end=' ')
  print(" ")	

4. Consider the process transition diagram of process management in the operating system given below.

a.



i. Write the process states indicated on the labels A,B,C and D.

ii. Write the reason for the transition in labels X,Y and Z.

iii. What does "swapping" mean in process management??

iv. "Even if the process is in the blocked state, it can be directly changed to running state at once ", Do you agree with this statement? Justify your answer.

b.

Assume a 64 KB program runs on a computer with 128 KB of physical memory. System page size is 8 KB. A portion of the page table of this process at a given time is shown in the table below.

Page number	Frame Number	Present/ Absent
0	6	1
1	11	1
2	2	1
3	14	0
4	3	1
5	0	0
6	12	0
7	5	1

i. Calculate Number of memory pages to be created
   a. ……..
ii. Calculate The number of bits used to represent the page offset
   a. ……
iii. Calculate The number of bits required to represent physical memory
   a. …….
iv. Page 0 has virtual addresses from ..... to ..... and page 1 has virtual addresses from ..... …….to ..... and so on.

v. Assume that this program needs to access virtual address 9000.

a. Write page number and page offset to Specify logical address 9000

……

b. What is the mapping frame number corresponding to the logical address according page to the table?

…….

c. Write mapping physical address logical address 9000.

…….

Part B

** Answer any four questions only*

5. Sayuni, which designs a computer device to add two given numbers, recognizes that when the two numbers are taken as bit stream A and B for inputs. another input has to be taken as the carry_in bit.

   i. Introduce the output she gets when adding the two numbers in bits.

   ii. Build a truth table for the outputs for those inputs mentioned above.

   iii. Build the SOP statement**s** for that output.

   iv. Simplify those SOP statements using Boolean rules.

   v. Simplify the SOP statements using karnaugh maps and confirm the answer.

   vi. Represent the three inputs and the outputs you obtained in the same logic circuit.

   vii. Draw the simplified logic circuits for the **carry out** output and the associated input circuit section using only the NAND gate and the NOR gate only.

   viii. Explain with your answer whether NAND gate integrated circuits are more suitable for designing logic circuits for SOP expression or NOR gate integrated circuits.

   ix. Convert the SOP statement you obtained in VIII above into a POS statement.

   x. Draw the Logic circuits separately for POS expression using only NAND gates and then using only NOR gates

6.

There are 4 computer labs of a computer institute in a four story building. The IP address of a third floor computer was identified as 180.12.150.195 and the subnet mask as 255.255.192.0.

a)

   i. Assume that this is a Class B address and write down the network address, broadcast address, and number of host addresses and host address ranges of that computer.

   ii. Complete the table below for each of the remaining computer labs, assuming that the host addresses are assigned to each floor, respectively.

Floor	Subnet mask	Net ip	1 st host	Last host	Broadcast ip
1					
2					
4					

b) The above organization later assigned the category of IP addresses 180.12.224.0/22 to its following computer resources for the purpose of efficiently assigning ip addresses to another computer lab in its possession.

i. How many ip addresses are there in this category of addresses??

ii. In that category, write the network address and broadcast address.

iii. Complete the table below by entering the data required for the subnet for the following computer resources.

Section	Computers	Server	Printer
A	100	LMS 01	Network printer 02, Printer 01
B	250	KMS 01	Printer 01
C	500	Proxy	Network Printer 01
D	50	HRMS	Printer 01
E	25	-	Printer 01

Section	Subnet mask	Net ip	1 st host	Last host	Broadcast ip
A					
B					
C					
D					
E					

c) Draw a network diagram of a secure network setup using the equipment and the appropriate minimum networking tools provided for the above network.

7.

A. Consider the following description of the Community Health Process of Medical Office of Health (MOH).

i. Draw a context diagram and a first-level data flow diagram that apply to the standard.

A newly married woman should register with her area (MOH). For this, they have to meet the Reception Clerk of the relevant Medical Officer of Health office and obtain an application form. When it is filled out and handed over to the receptionist, she gives the details to the Midwife. The Midwife will place the information on the application in the member information file and issue a registration card to the woman. A copy of that card is deposited in the B card file as the B card. Then she becomes a registered member of that (MOH).. After registering, the Midwife notifies the member women to attend the various sessions. Once a member woman becomes pregnant, she becomes a registered mother in the Medical Officer of Health's office. Mothers should see a doctor every month at the medical clinic to check their health. Then the doctor takes the B copy of the pregnancy note. The doctor will record the health status of the mother on the pregnancy note and then puts it in the mothers' details file.

ii. In the above case, identify the two processes that take place in the place of the midwife(process)

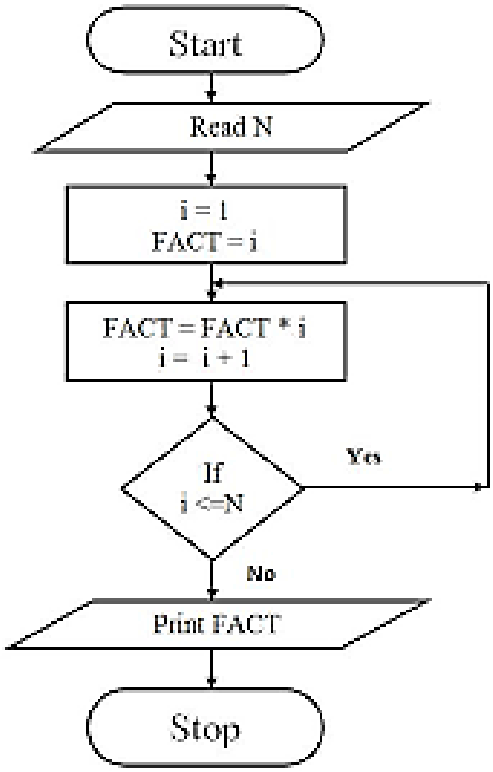
iii. Draw a Level 2 data flow diagram to represent only the processes at the location of the midwife (process).

B. Write two advantages and two disadvantages of COTS software.

8.

A. Suppose the **n** is integer input. Implement an algorithm using flow chat or pseudo-code find the factors (all the divisors) of **n**.

B.



i. What is the output when input N is 5?

ii. Write a recursive function to implement the above flow chat using python.

9. The following is part of a logical data plan designed for the A and B Covid injection process.
   A. Vaccine(vaccineName, company, batch_Number, dose01,dose02,dose03)
   B. Patient(patient_id, FirstName,middleName,surname, nic DOB, gender,)
   C. Patient_phone(nic,phone)
   D. Center(centerID, centerName,centertype, docID)
   E. Doctor(docID,doc_name,specialization)
   F. Patient_Vaccine (vaccineName, patient_id, given_date,dose)

The age of the above patient is calculated based on the date of birth and one specialist doctor is attached to each center. Note that the patient's name consists of three parts.

a) Write down the level of normal form that exists for each relationship separately.

b) Write 3 examples for attribute types that are different from normal attributes and name their differences.

c) Identify the further normalized relationship between the above relationships, name and briefly explain the anomalies of that.

d) Normalize that relation into next normalized form.

e) Draw an ER diagram for the relations that appear after the normalization.

f) Write the DDL type SQL statement to create a table based on the Center entity here (apply the required constraints as appropriate).

i. Write the SQL statement to add an attribute as Location to the Center table.

ii. Write the SQL statement to add raw to the table with here..centerID=101, centerName=”Ragama”,centertype=”MOH”, docID=”P02”

iii. From that table write the SQL statement to find out the names and specialties of the doctors attached to the "Hospital" for centertype

iv. Write the SQL statement to change the type of center to "Hospital" which is specified as centerID=”1005 “

10.

A. Ms. Dinesha, the owner of an e-commerce website decided to include a multi-agent system for Information searching. There users submit their search criteria for products through their respective interface agents who then connect with information broker agents that filter information received through agents at various merchant sites and submit it to the users.

a. Define the term “Multi agent systems”.
b. Draw a simplified agent system for the above multi-agent system. Name all the entities in your diagram and clearly indicate the interactions between them.
c. Write one major advantage of this multi-agent system.
d. Write one ICT related challenge when creating a sub agent.

B. "Ravimal" is a large store in the Gampaha district and that sells Bags. The owner of the store wants to expand the business by offering products and services information to customers in all over the country as well as in the world via an E-commerce website. Then customers can search and select for their required bag through internet. As well as customer can be able to confirmed the orders online.

a. According to the above scenario what is the most suitable e-commerce business type?
b. Name the revenue model, that the owner of the “Ravimal” expects for the above e-commerce web site.
c. State one e-marketing method that you would propose to attract customers to the planned e-commerce web site.
d. "The Most of the regular customers prefer to visit the physical stores and buy bags rather than using e-commerce site even if they have enough resources and knowledge regarding e-commerce websites". Write two possible reasons for the above statement.
e. Kamal is a person who lives in Kandy and sells bags to foreigners. Kamal buys bags through "Ravimal's” e-commerce website. What is the most suitable e-commerce business type for this service?
f. Kamal wants to know secure payment methods that can be used for online payment and state two methods.