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 Department of Education - Western Province

අධ්‍යයන පොදු සහතික පත්‍ර (උසස් පෙළ) විභාගය 2022- උපකාරක ප්‍රශ්න පත්‍රය 04
 General Certificate of Education (Adv. Level) Examination 2022- Model Paper 04

තොරතුරු හා සන්නිවේදන තාක්ෂණය - II
 Information & Communication Technology - II

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II

පැය තුනයි
 Three Hours

Part A – Structured Essays
 Answer all the four questions in this paper

01.

a). Draw the expected output from the following code snippet when rendered by a web browser..

```
<html>
<body>
<table border="1">
<tr><th>STNO</th><th>NAME</th><th>ADDRESS</th></tr>
<tr><td>001</td><td>Nimali</td><td rowspan=2>Gampaha</td>
<tr><td>002</td><td>Kumari</td></tr>
<tr><td>003</td><td>Amali</td><td>Colombo</td></tr>
</table>
</body>
</html>
```

b). Answer this section using the code below.

```
1      <html>
2      <head><style>
3      P{
4      color:green;
5      }
6      .program{
7      color:red;
8      }
9      </style></head>
10     <body>
11     <p>welcome to ICT class</p>
12     <h2 class="program">Hypertext Markup Language</h2>
13     <p class="program">cascading style sheets</p>
14     </body></html>
```

- i. Write the colors obtained for text numbers 12 and 13 by rendering the above code through a web browser.

Text number	Text	color
12	Hypertext Markup Language
13	cascading style sheets

- ii. Write 2 advantages of an external style sheet over an internal style sheet.

.....

.....

- c). i. Fill in the blanks in the following PHP code snippet.

Below is the code required to retrieve the student's name (StName) and number (Stno) from the student table through a database.

The username and password are given below.('admin','ict@123') The database name is ICTDB..

```
<?php
$conn= new mysqli("localhost", ".....", ".....", ".....");
if ($conn->connect_error)
{ die("Connection failed: " . .....->connect_error); }
else
{ echo " Connected Successfully ";}
$sql = "SELECT Stno, ..... FROM Student";
$result = $conn->query(.....);
if (.....->num_rows > 0)
{
    while($row = $result->fetch_assoc())
    {
        echo "Student No:". $row["....."]." = Name: ".$row[ "StName"]."<br>";
    }
}
else
{
    echo "No results";
}
.....->close();
```

- ii. Write a reason why POST method is more suitable than GET method for sending data through an online form to provide user payment details during online purchase.

.....

02. a). Choose and write the most appropriate word from the list to fill in the blank in each of the following clauses.

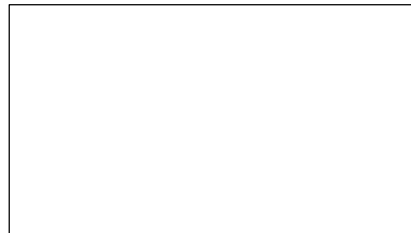
(Noise, Amplitude, Distortion, Frequency, Hackers, Trojan, Ring, Bus, Ransomware, MAC Address, IP address, Port address)

1. The change in the properties of the signal due to the capacitance and inductance of the communication medium is called
2. The frequency or phase of the carrier signal remains unchanged in the modulation.
3. is a malicious computer program that misleads the user without revealing its true purpose.
4. A computer communicates clockwise or counterclockwise with a computer or all computers on the network in a network topology..
5.allows to be uniquely identified the interface of a device on the computer network and enables accurate data transmission to the receiving interface..

b).

i) Write the output of the following Python code.

```
def edu(a,b=[]):  
    b.append(a)  
    return b  
print(edu(2,[3,4]))
```



ii) What does return do in the above function?

.....

iii) Write the output if the function call changed to print(edu(2)).

.....

03.

subject

SubjectId	Subject
20	ICT
01	Physics
31	Business Statistics
33	Accounting

Student

StudentID	studentName	Address	SubjectID
001	Ashvini	Horana	20
002	Samadhi	Col 05	20
003	Kithmini	Pelawatta	01
004	Senindi	Kandy	31

- i. Write the SQL statement to create the above student table.

.....

.....

.....

.....

- ii. What is the cardinality relates to the relationship between the data in the above Student table and the Subject table? Explain the reasons.

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.....

.....

.....

- iii. Write a SQL statement to insert the record of student Ashwini into the student table.

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.....

.....

- iv. Write a SQL statement related to changing the address of the student named Samadhi to Colombo 07.

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04. a). The textile sales system (TIS system) related to “Ransalu textile” shop is described below.

When the customer hands over his fabric and amount of money to the cashier, he processes the bill and issues a bill back to the customer. When the customer hands over the clothes to be exchange to the cashier, they are sent them to the exchange counter. A receipt with approval from the sales manager there should be given to the customer to re-exchange the fabric through the exchange counter.

Draw the context diagram that matches the above process.

- b) Choose and write the most appropriate word for the following events from the given list of words.

(Virtual Storefront, C2C, C2B, B2C Information Brokers, Virtual Communities, Online Service Providers, Crypto currencies, Cryptography, Electronic Catalog)

1. An interface system that helps the customer to select and compare products acting as an interface on an electronic screen built using digital technology -
.....
2. Websites that help consumers to filter the required information from information sources that are publicly available to consumers are called this. -
.....
3. is used by connecting individuals through online social networks by exchanging ideas or feelings of similar interests.

4. A form of transaction which occurring reverse auction .. -

.....

5. A digital amount similar to the currency to be used to exchange for goods and services.

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Section B – Essays

This section consists of six (06) questions. Answer only four (04) of these questions.

- (1) A security system used for night security of a house is controlled by three sensors A, B and C. Sensor A senses the movement of an object, sensor B senses light intensity and sensor C senses the distance to an object from the front entrance of the house. The values of the three sensors are as follows.

Sensor	Result	Logical Values
A	Indicates a movement	1
A	No movement	0
B	Illuminated	1
B	dark	0
C	There is an object within 5m	1
C	There is no object within 5m	0

At a moment of darkness around, if any object shows movement within 5m, a high-brightness light bulb attached to the entrance lights up. (logical value 1)

- (a) Construct the truth table showing the operation of the above circuit
- (b) Based on the truth table in part (a) above, derive a POS statement
- (c) Simplify the expression derived in part (b) above using a Kano map.
- (d) Construct a logic circuit for the simplified expression in part (c) above using only NOR gates.
- (2) A computer network has been established and Internet connection has been obtained using a router to efficiently exchange information in Abacus. The network address here is 195.100.45.128 /26. A data packet with IP address 195.100.45.130/26 and a data packet B with IP address 195.100.45.200/26 arrive at the network.
- (a) Do A and B route data packets into Abacus's network? Give reasons.
- (b) Parity Checking is a simple technique used to detect errors in data communication. Explain how the even parity check can be performed to find out if there is an error in the transmission of the seven bits 1001110.
- (c) (i) What is a public IP address?

(ii) What is the main difference between public IP and private IP addresses?

d) There are two local area networks LAN 1 and LAN 2 with different IP addresses. There are 02 computers named X and Y respectively in these local area networks.

(i) Which communication device should be used to connect LAN 1 and LAN2 to each other for communication between Computer X and Computer Y (assume that LAN 1 and LAN2 are not connected to any other network)

(ii) Draw the logical plan of the network described in part (d) (i) to communicate with computers X and Y each other using common symbols.

(iii) Consider the transmission of the data packet A from computer X to computer Y. When data packet is In LAN 1, IP addresses of which devices are mentioned as the source and destination IP of the data packet?

iv) When a data packet A successfully delivered from computer X to computer Y, the data packet is contained in a frame called F. The address of which device is mentioned as the source MAC address in F ?

(3) Marketing using E-Commerce, Websites, social media networks is a very popular sales method today. For example, social networks like Facebook, Youtube, Whatsapp etc. have more than 2 billion users. Here, Shopbot and Chatbot, created using artificial intelligence agent technology, have the ability to understand customers' tastes and purchasing patterns, and Chatbot has the ability to identify customer needs and respond immediately.

Here, computer languages using artificial intelligence are used to study each customer. It works closer to the customer by providing personalized answers that will satisfy the customer. Also Chatbot collects data, explores consumer behavior and Shopbot provides unlimited shopping experiences.

By analyzing this data, e-commerce website owners hope to increase their market share.

a. Write 3 examples for websites that conduct online business using the above methods.

b. What type of e-business transactions are conducted between those online shoppers and consumers?

c. Write 2 computer languages that use artificial intelligence as mentioned above.

d. Write 2 advantages that e-commerce websites get by using Shopbot.

e. Write a functional requirement and a non-functional requirement of the Chatbot above.

f. Describe using a diagram the appropriate agent technique that can be used to describe above process.

i. Is multi-agent technology used here? Give reasons

- (4) (a) For an amount borrowed for the required number of years at 10% annual interest, draw a flow chart to calculate the amount due at the end of the period.
- Interest is calculated as follows
- The annual interest payable on the loan amount is calculated and the interest is added to the basic loan amount and the new loan amount payable at the end of the first year is calculated. In the second year, the annual interest is calculated again on the new loan amount and the interest is added to the loan amount and the loan amount to be paid at the end of the next year is calculated. In this way, the annual interest is added to the loan amount every year and the loan amount is updated.
- (b) Show the Python program related to the operation of flow chart.
- (c) Show the Python program related to the operation of flow chart.
- (5) ABC enrolls students into the university and these students are classified as internal and external. The student number (SID) and name (Sname) of the students are stored and only for the external students the number of hours studied (Hours) is stored separately. Students join their respective courses and one student can join multiple courses. A course can have large number of students. The name of the course (Coursename) and number (CNo) are stored. Lecturers participate in teaching these courses and one lecturer teaches several courses. But there is only one lecturer per course. Lecturer can be permanent or temporary. Stores the instructor's ID (LID), Lname and CourseName. Each lecturer is given a car and this car must be returned when leaving the university. Stores the car number (CarID) and type (Made). Draw an Extended Entity Relationship Diagram (EER diagram) to represent the above phenomenon. View all connections and features. State assumptions if any.
- (6) Due to the current shortage of fuel, fuel was issued in relation to a QR code to prevent blockages in fuel stations. How the system works is given below.

- Registration

The vehicle owner must register his vehicle in the system. Here the vehicle owner enters his information into the system. It is checked against the "owner_db" database whether the information has been registered before. A message is issued to the owner that the previously entered information is invalid. Information that has not been registered before is stored in the database. A message will be displayed to the vehicle owner to enter the vehicle details. Verify the validity of the information using the "vehicle_det" database. If the information is not valid information, a message indicating that the information is not valid will be displayed to the owner. Otherwise the information is stored in the "vehicle_det" database. The QR code containing the relevant information is given to the vehicle owner. All fuel stations must also be

registered by entering information. The information is stored in the "Indhahal" information store.

- Issuance of fuel

When issuing fuel from the fuel corporation to the fuel station, the fuel issuing officer stores the information (type of fuel issued, date, quantity) in the database named "Fuel". Vehicle owners provide their QR code to the pumper while getting fuel for their vehicles. By scanning the QR code, the pumper enters the information into the system and confirms the identity. Also, the status of their fuel quota is checked. Fuel is issued to vehicles whose identity is verified. The pump keeps the system updated with the amount of fuel dispensed.

Calculation of fuel quantity

The current status of the vehicle owner's fuel quota is calculated based on the amount of fuel entered into the system. It stores in "Owner_det" database.

The vehicle owner will receive a short message on the phone indicating the amount of fuel issued and the remaining fuel quota.

It also calculates the current amount of fuel at the fuel station, which is also stored in the "Fuel Station" database. The fuel station owner can access the system and check the current fuel quantity of the fuel station at any time.

Accordingly, it is also possible to send a fuel order to the fuel corporation through this system.

- (i) Draw the Business Function Model (BAM) for the above system
- (ii) Draw the first level data flow diagram related to the above system