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கல்விப் பொதுத் தராதரப் பத்திர(உயர் தர) முன்னோடிப் பரீட்சை - 2020
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தகவல் தொடர்பாடல் தொழில்நுட்பவியல் II
 Information & Communication Technology II

20 E II

Part - II B
 (Answer any four questions only)

- Following is the conduct of the logic circuit of a digital system, where the inputs are X, Y, Z (three decimal values) and the output is R: If the value of X is 1 or if the value of Z is 1, the output will be 1.
 - Draw the truth table for the output R
 - Write the Boolean equation of R in Sum of Products (SoP) form.
 - Simplify the Boolean equation derived in (b) using the Boolean rules. (Rules need to be mentioned)
 - Draw a logic circuit using NAND gate having two inputs only for the simplified equation derived in (c).
 - What is the purpose of using NAND gates instead of NOT, AND, OR gates when making logic circuits?
 - Draw a logic circuit to add two decimal numbers and write its truth table.
- Write the layers of OSI model and denote the data components used in each layer.
 - A network has to be established by joining three faculties of a university. Number of computers in each faculty are below. One local network is needed for each faculty.

Faculty	Number of computers
Science	110 computers
Commerce	40 computers
Medicine	50 computers, 1 printer

University received the IP address 200.116.10.0/24. It is decided to set up three subnets from this address group, and then to reserve IP addresses for computers.

Write down the subnet mask address for each faculty and IP address range that could be used, by considering such sub netting is done.

University is going to give an internet connection for the science faculty for the reason all computers need to be given with an internet connection. Science faculty is situated a bit far from the other two buildings. In this faculty, one computer is going to be the DNS server and another computer is going to be the proxy server. Whole network is decided to be protected by a firewall.

Draw the network diagram representing logical arrangement of the computer network of university by connecting all three sub networks above. Clearly denote the network devices and IP addresses.

3.

a) 'ShopMe' is a marketing company that has its branches in several districts of Sri Lanka.

It decided to create a web portal based on the internet in order to expand its services.

Through this customers can order the goods from a web site while staying at home.

- i. What is the type of e-commerce mentioned in the above scenario? Justify your answer.
- ii. Mention two methods to process online payments in the planned e-business
- iii. What is meant by e- marketing?
- iv. Explain a method of e- marketing for the e- business mentioned above.
- v. Give two techniques used when carrying out database marketing in this e-business.

b)

- i. Give two main capabilities of neural networks.
- ii. Give two examples of neural networks used in modern computer application.

4. Consider inputting a list of positive numbers.

Example [64, 55, 22, 10, 89, 120, 75]

- a. Draw a flowchart denoting the process of outputting the sum of even numbers less than 100 from a list n positive numbers as shown above.
- b. Develop a python program to execute the above flowchart.

5. A school has many sports for the students to play. One separate coach coaches each of these sports. Details of the students, the sports they play, and the coaches for them are stored in a separate table.

(StudentId, StudentName, PracticeHrs, SportId, SportName, CoachId, CoachName)

One student can participate in more than one sports and in one sports more than one student can be coached. one separate coach is appointed for each of the sports.

The subjects students learn in this school, teachers of those subjects, and the scores of the students are stored in the separate table below.

(StudentId, StudentName, SubjectId, SubjectName, Marks, TeacherId, TeacherName)

Many teachers can teach one subject. One teacher is allowed to teach one subject only. One subject can be studied by more than one student and more than one student can study one subject.

Student by StudentId, sports by SportId, coach by CoachId, teacher by TeacherId are uniquely identified.

- a) What are the conditions needed to be fulfilled for the tables to be in 1st, 2nd and 3rd normalization respectively.
- b) Write the table format derived when converting above two tables to relational tables, in third normalization.
- c) Draw the ER diagram, to get the table format in (b). Clearly denote the objects, key attributes, relationships.

6. Medicare is a frontline company giving medical advice. It is implemented using the Medical Counselling System (MCS). A person can inquire by calling the receptionist for medical counselling. The receptionist will give an answer to the inquiry to that person. That person can book the doctor he prefers. When booking, the person's name, age, telephone number will be recorded by the receptionist in the **Booking book**.

After that, the receptionist will inform the series no, date of appointment, time derived from the booking book to the person.

Receptionist will get the series no and give the payment slip to the person when he comes on his appointment date. A copy of the payment slip is given to the cashier.

Person will give payment slip and money to the cashier and get the receipt. During this, the cashier will enter the payment details in the **Payment file** and mark 'present' in the **Booking book**, the person will become the patient now.

The cashier will send details of the patient who paid the money to the doctor. When the patient who paid the money is receiving the counselling, his serial no will be followed. Patient will show his receipt to the doctor and inform the doctor about his symptoms. Doctor will give the advice to him. The doctor will give a prescription sheet to the patient.

Draw the above medical counselling booking system in Data Flow Diagram Level 1.