PAPER**: E-COMMERCE TECHNOLOGY**

EXAM PAPER: **CASE STUDY**

CREDIT VALUE: **16**
DURATION: **6 HOURS**
NATURE OF EXAM: **WRITTEN**

SECTION A: ANALYSIS (30 MARKS)

1) What is the backbone network? (1 mrks)
2) What are routers?(1 mark)
3) Define the 7 different layers of the OSI Reference Model (3 marks)
4) Compare between TCP and UDP(2 marks)
5) Define the 4 different layers of the TCP/IP Reference Model(3 marks)

SECTION B: Database development and administration (25 marks)

Table: **Employee**

EmpId	FullName	ManagerId	DateOfJoining
121	John Snow	321	01/31/2014
321	Walter White	986	01/30/2015
421	Kuldeep Rana	876	27/11/2016

Table EmployeeSalary

EmpId	Project	Salary
121	P1	8000
321	P2	1000
421	P1	12000

1) **Write a SQL query to fetch the count of employees working in project 'P1'.**
2) **Write a SQL query to fetch employee names having a salary greater than or equal to 5000 and less than or equal 10000.**
3) **Write a SQL query to fetch project-wise count of employees sorted by project's count in descending order.**
4) **Write a query to fetch employee names and salary records. Return employee details even if the salary record is not present for the employee.**

SECTION C: Algorithm and programming (40 marks)

Algorithm (10 marks)

1) **How do you find the missing number in a given integer array of 1 to 100?**
   You are given a list of n-1 integers and these integers are in the range of 1 to n. There are no duplicates in the list. One of the integers is missing in the list. Write an efficient code to find the missing integer.

Example:

Input: arr[] = {1, 2, 4, 6, 3, 7, 8}

Output: 5

Explanation: The missing number from 1 to 8 is 5

Input: arr[] = {1, 2, 3, 5}

Output: 4

Explanation: The missing number from 1 to 5 is 4

2) Given an array of n elements that contains elements from 0 to n-1, with any of these numbers appearing any number of times. Find these repeating numbers in O(n) and using only constant memory space.

Example:

Input : n = 7 and array[] = {1, 2, 3, 6, 3, 6, 1}

Output: 1, 3, 6

Explanation: The numbers 1 , 3 and 6 appears more

than once in the array.

Input : n = 5 and array[] = {1, 2, 3, 4 ,3}

Output: 3

Explanation: The number 3 appears more than once

in the array.

3) Given an array of integers, and a number ‘sum’, find the number of pairs of integers in the array whose sum is equal to ‘sum’.

Examples:
Input : arr[] = {1, 5, 7, -1},

sum = 6
Output : 2
Pairs with sum 6 are (1, 5) and (7, -1)
Input : arr[] = {1, 5, 7, -1, 5},
sum = 6
Output : 3
Pairs with sum 6 are (1, 5), (7, -1) &
(1, 5)
Input : arr[] = {1, 1, 1, 1},
sum = 2
Output : 6
There are 3! pairs with sum 2.
Input : arr[] = {10, 12, 10, 15, -1, 7, 6,
5, 4, 2, 1, 1, 1},
sum = 11
Output : 9

Procedural programming (20 marks)

1.
Write a function which will be given as input an array, its size and an integer p. The function will then cyclically shift the array p positions to the right: each element is moved p positions to the right, while the last p elements are moved to the beginning of the array. For example: if we have the array [1 2 3 4 5 6], shifting 2 positions to the right should give the array [5 6 1 2 3 4]. Your function should work correctly for negative values of p.

2.

Write a function that decides if a given char array is a palindrome. A palindrome is a word/phrase that can be read the same from left to right as from right to left. Example: EVE, MADAMIMADAM, ABBA are palindromes.

3.

Write a function which, given an array of integers, returns the integer that appears most frequently in the array. E.g. for the array [1 2 3 2 3 4 2 5] your function should return 2.

Object Oriented Programming (10 marks)

1) Design a class for a **toy** manufacturing plant. Assuming that 10 toys may be produced each hour, the class object will calculate how many days it will take to produce any number of toys. (The plant operates two shifts of eight hours each per day.)

2) Write a program that asks the user for the number of toys that have been ordered and then displays the number of days it will take to produce them.

•Input Validation: Do not accept negative values for the number of toys ordered.
*•Hint (Formula) : numDays = numToys / (shiftLenght * shiftsPerDay * toysPerHour)*

SECTION D : Networking

QUESTION 1:

We have a big single network having IP address 200.1.2.0. We want to do subnetting and divide this network into 20 subnets.

I. While showing your work clearly, represents the first 5 subnets in a tabular form.(4 marks).
II. State the third usable address in subnet (6 marks).