ACMT 211

QUESTION ONE

(a)   When do we say that a system of equations is inconsistent.   (2 marks)

(b)   Differentiate between Class-limits and Class boundaries in grouped frequency tables.

                                                                                      (4 marks)

(c)   Explain the queue operations that are used to perform creation, deletion and display of
        elements in a queue.   (3 marks)

(d)   Outline five Merits of Survey Methods.   (5 marks)

(e)   Solve the system of equations $x_1 + x_2 + x_3 = 1$, $3x_1 + x_2 - 3x_3 = 5$ and $x_1 - 2x_2 - 5x_3 = 10$
        by LU decomposition method.   (8 marks)

(f)   Solve the following system of linear equations using iterative Jacobi method.   (8 marks)

$$4x_1 + 2x_2 - 2x_3 = 0$$

$$x_1 - 3x_2 - x_3 = 7$$

$$3x_1 + x_2 + 4x_3 = 5$$

QUESTION TWO

a)   List five practical applications of data structures.   (5 marks)

b)   Find the eigenvalues and eigenvectors for the below matrix.   (15 marks)

$$\begin{pmatrix} 2 & 0 & 0 \\ 0 & 3 & 4 \\ 0 & 4 & 9 \end{pmatrix}$$

QUESTION THREE

a)   Discuss the five sections of a questionnaire.   (10 marks)

b)   Use Gaussian elimination to find the solution for the given system of equations.

     (10 marks)

$$2x+5y=9$$
$$2x+5y=9$$
$$x+2y-z=3$$
$$-3x-4y+7z=1$$

QUESTION FOUR

a)   What is a queue? How is it different from a stack?   (4 marks)

b)   List and explain two non-linear data structures   .(4 marks)

c)   A student is interested in whether there is a relationship between gender and major at her college. She randomly sampled some men and women on campus and asked them if their major was part of the natural sciences (NS), social sciences (SS), or humanities (H). Her results appear in the table below. What would be the expected frequency of women in social sciences based on this table?   (4 marks)

	NS	SS	H	Total
Women	10	14	10	34
Men	11	8	4	23
Total	21	22	14	57

d)   Discuss the four types of linked lists.   (8 marks)

QUESTION FIVE

a)   Explain what is a leaf node.   (2 marks)

b)   Explain the types of checks done during processing, editing and correction of data.

     (8 marks)

c)   Write a R program to create a list named s containing sequence of 15 capital letters, starting from 'E'. Display the sample output.   (10 marks)