

Module-4

- 7 a. Out of 30 students in a hostel, 15 study History 8 study economics and 6 study geography. It is known that 3 students study all these subjects. Show that, 7 or more students study none of these subjects. (05 Marks)
- b. Find the number of derangements of 1, 2, 3, 4 also write them. (05 Marks)
- c. Find the root polynomial for the 3×3 board by using the expansion formula:

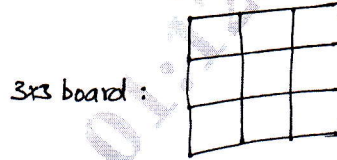


Fig.Q.7(c)

(06 Marks)

OR

- 8 a. Determine the number of positive integers n such that, $1 \leq n \leq 100$ and n is not divisible by 2, 3 or 5. (06 Marks)
- b. There are 8 letters to 8 different people to be placed in 8 different addressed envelopes. Find the number of ways of doing this so that at least one letter gets to the right person. (05 Marks)
- c. By using the expansion formula, find the rook polynomial for the Board C shown below: (05 Marks)

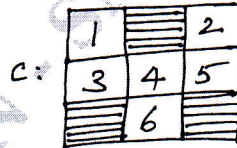


Fig.Q.8(c)

Module-5

- 9 a. Define isomorphism. Verify for isomorphism of G_1 and G_2 :



Fig.Q.9(a)

(05 Marks)

- b. Define the following: i) Complete graph ii) $K_{m,n}$ iii) Hamiltonian graph iv) Eulerian graph iv) Hand shaking property. (05 Marks)
- c. Define optimal tree. Find the weight of the optimal tree constructed for the weights, 20, 28, 4, 17, 12, 7. (06 Marks)

OR

- 10 a. i) A complete ternary tree $T = (V, E)$ has 34 internal vertices. How many edges does T has? How many leaves? (05 Marks)
- ii) Discuss the properties of complete m -ary tree. (05 Marks)
- b. i) Explain self-complementary graphs. (05 Marks)
- ii) Explain Konigsberg Bridge problem. (05 Marks)
- c. Obtain an optimal prefix code for the message MISSION SUCCESSFUL. Indicate the code. (06 Marks)