

Mathematics-I (Discrete Maths)

Roll No _____

Paper-BC-203(N₂)

Time: 3 Hrs.

M.M.: 60

Note :- Attempt any two questions each from section A and B and the entire section C.

Section A

Q1. If A and B are any two sets then, show that,

$$(A \cap B)^c = A^c \cup B^c$$

Q2. Define a symmetric relation and show that a relation R is symmetric iff $R^{-1} = R$

Q3. How many words can be formed out of the letters of the word 'CARAVELLE'? How many of them begin with R?

Q4. Prove that the conditional operation distributes over the operation of conjunction.

Section B

Q5. If $S_n + 3S_{n-1} - 4S_{n-2} = 0$, $n \geq 2$, $S_0 = 3$, $S_1 = -2$, find the generating function and the sequence which satisfies it..

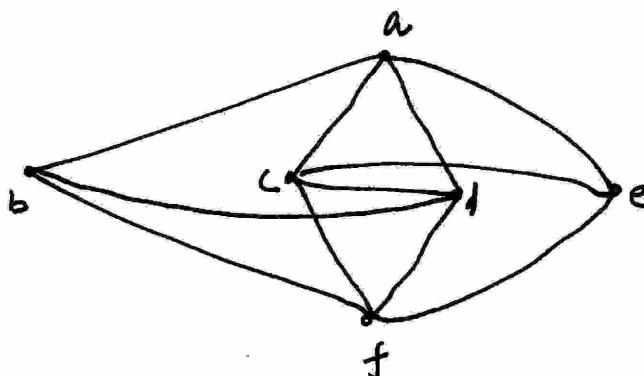
Q6. Define the terms,

- (i) A regular graph
- (ii) A complete graph
- (iii) A Hamiltonian graph
- (iv) A rooted tree

Give an example in each case.

Q7. Prove that the sum of the degrees of the vertices of the following undirected graph is twice the number of edges in the graph,

Q8. Find the chromatic number of the following graph,



Section C

Q9. (a) Under what condition or conditions the union and intersection of any two sets is equal ?

(b) Define the complement of a set and give an example.

(c) Give an example of a relation which is transitive but not symmetric.

(d) Determine the truth value of , " If Chandigarh is the capital of Punjab, then $3+3 = 7$.

(e) If $2P(5,3) = P(n,4)$, find n.

(f) Define a recurrence relation and give an example.

(g) Define the term , " isomorphism of graphs".

(h) Define a bipartite graph and give an example.

(i) Define a spanning tree.

(j) Define chromatic number of a graph and give an example.

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