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Total No. of Pages: 02
Total No. of Questions: 09

B. Tech.(CSE, IT) (Sem.-4th)
DISCRETE STRUCTURES
Subject Code: BTCS-402
Paper ID: [A2305]

Time: 3 Hrs.

Max. Marks: 60

INSTRUCTIONS TO CANDIDATE:

- 1. Section-A is compulsory consisting of TEN questions carrying two marks each*
- 2. Section-B contains FIVE questions carrying FIVE marks each and student has to attempt any four questions.*
- 3. Section -C contains THREE questions carrying TEN marks each and student has to attempt any two questions*

SECTION-A

Q.1. Write Briefly:-

- (a) How many full binary trees are there with 2 internal vertices?
- (b) Define group.
- (c) Define semi group.
- (d) Define identity functions with example.
- (e) Define invertible functions with example.
- (f) Define asymmetric relation with example
- (g) Define connected and disconnected graphs.
- (h) Define symmetric relation with example.
- (i) Write elementary properties of a ring.
- (j) What is difference between a graph and a tree.

SECTION-B

Q.2. IF A and B are any two sets then prove that

$$A \cup B = A \cap B \Leftrightarrow A = B$$

Q.3. If R is an equivalence relations in a set A, then prove that R^{-1} is also an equivalence relation.

Q.4. Solve the recurrence relation $a_{n+2} - 2a_{n+1} + 4a_n = 0$.

Q.5. Draw regular graphs of degree 2 and 3.

Q.6. Show that the sum of degree of all the vertices in a graph G , is even.

SECTION-C

Q.7. Prove that the intersection of two ideals of R is an ideal of R .

Q.8. Solve the recurrence relation $a_{r+2} - 3a_{r+1} + 2a_r = 0$, by the method of generating function with the initial conditions $a_0 = 2$ and $a_1 = 3$.

Q.9. Show that the following Boolean expression are equivalent:

a) $x \wedge (y \vee (y \wedge (y \vee y)))$; x

b) $(z \vee x) \wedge ((x \wedge y) \vee z) \wedge (z \vee y)$; $x \wedge y$.

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