Roll No.

Total No. of Pages: 02

Total No. of Questions: 18

B.Tech. (CSE/IT) (2012 Onwards) (Sem.-4)

DISCRETE STRUCTURES

Subject Code: BTCS 402 Paper ID: [A2305]

Time: 3 Hrs. Max. Marks: 60

INSTRUCTIONS TO CANDIDATES:

- SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
- 2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
- 3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

Answer briefly:

- 1. Define an equivalence relation. Give an example.
- 2. If $A \subset B$ then show that $A^c \subset B^c$ where A and B are any two sets.
- 3. State the boundedness law of Boolean algebra.
- 4. When a ring is said to be without zero divisor?
- 5. Write the generating function corresponding to the numeric function,

$$a_n = 2^n + 3^n$$
, $n \ge 0$.

- 6. Give an example of a finite group.
- 7. Under what condition or conditions, a non empty subset H of a finite group G is its subgroup.
- 8. Find the chromatic number of the graph, $K_{2,3}$.
- 9. Define a Hamiltonian cycle.
- 10. Define a graph. When it is said to be connected?

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SECTION-B

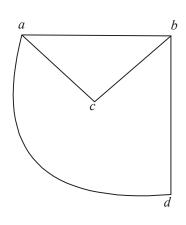
- 11. Let A =(1,2,3,6). Define a relation R on A as a R b iff a divides b. Show that R is a partial order.
- 12. Show that the intersection of two right ideals of a ring is again a right ideal of the ring.
- 13. Solve the recurrence relation, $a_n = 2a_{n-1} a_{n-2}$, $n \ge 2$ with the initial conditions : $a_0 = 1, a_1 = 4$.
- 14. Prove that a group G each of whose elements other than identity is of order 2 is abelian.
- 15. Show that a connected graph G with e = v 1 is a tree.

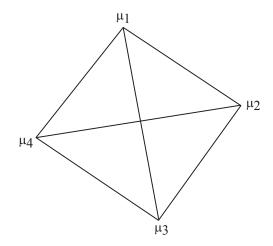
SECTION-C

- 16. Let a, b be elements of a Boolean algebra then show that, $(a \land b)' = a' \lor b'$
- 17. Let H be a subgroup of a group G then prove that the relation

 $R = \{(x,y): x,y \in G, x^{-1}y \in H\}$ is an equivalence relation.

18. Check if the following graphs are isomorphic or not.





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