20P162 (Pages: 2) Name: ...……

Reg.No……...

FIRST SEMESTER M.Sc. DEGREE EXAMINATION, NOVEMBER 2020

(CUCSS-PG)

(Regular/Supplementary/improvement)

CC19P CSS1 C01 - DISCRETE MATHEMATICAL STRUCTURES

(Computer Science)

(2019 Admission onwards)

Time: Three Hours Maximum: 30 Weightage

PART A

Answer any ***four*** questions. Each question carries 2 weightage.

1. Define permutation group.
2. Define Boolean algebra and its properties.
3. Explain equivalence relation with suitable example.
4. Let A= {a, b, c} and P(A) be its power set. Let ⊆ be the inclusion relation on P(A). Draw Hasse diagram.
5. Write down the elementary properties of a group.
6. Obtain the PCNF of the following formula:$q \wedge (p \vee \sim q)$.
7. Define (i) subgraphs (ii) isomorphic graphs with suitable examples.

(4 x 2 = 8 Weightage)

PART B

Answer any ***four*** questions. Each question carries 3 weightage.

8. Compare bipartite and complete bipartite graphs.
9. Find the inverse of the function$f(x) = x^3 - 1$..
10. Let $f: Z \to Z$ be a function defined by f(x) = 2x+3. Let $g: Z \to Z$ be a function defined by g(x) = 3x+2. Find (i) $f^o g$ (ii) $g^o f$. Also show that commutative law does not hold for the composition functions.
11. Define rings and integral domains.
12. What are the different normal forms in mathematical logic?
13. What do you mean by distributive and complemented lattices?
14. State and prove De-Morgan's laws on set theory.

(4 x 3 = 12 Weightage)

PART C

Answer any ***two*** questions. Each question carries 5 weightage.

15. Explain predicates and quantifiers?

16. Consider the lattice L= {1,2 3,4,6,12}, the divisors of 12 ordered by divisibility. Find

    (i) The lower bound and upper bound of L.

    (ii) The complement of 4.

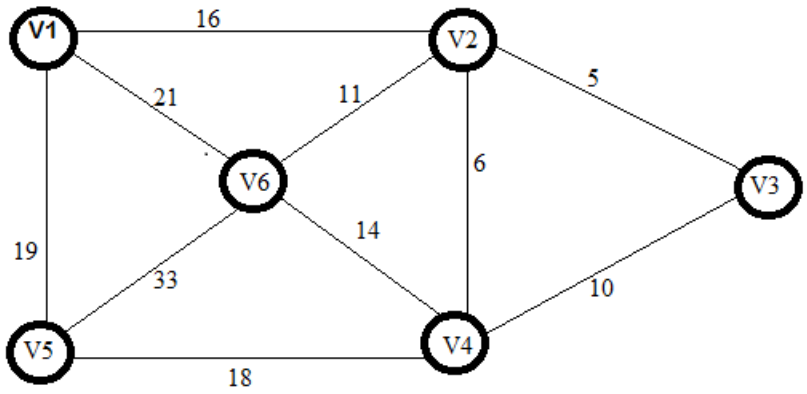
    (iii) Is L a complemented lattice?

    (iv) Construct the Hasse diagram.

17. (a) Show that the set of all positive rational numbers forms an abelian group under the composition defined by $a * b = \frac{ab}{2}$

    (b) Prove that every field is an integral domain.

18. Use kruskal's algorithm to find minimal spanning tree.



(2 x 5 = 10 Weightage)

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