24P158

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Name: ....

Reg.No: ....

FIRST SEMESTER M.Sc. DEGREE EXAMINATION, NOVEMBER 2024

(CBCSS - PG)

(Regular/Supplementary/Improvement)

CC19P CSS1 C01 - DISCRETE MATHEMATICAL STRUCTURES

(Computer Science)

(2019 Admission onwards)

Time : 3 Hours   Maximum : 30 Weightage

Part-A

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

1. Write the negation of the following statement. " If I drive, then I will not walk".

2. Differentiate between universal and existential quantifiers.

3. What do you mean by closure of a relation?

4. Define Distributive and Complemented lattice.Explain with example.

5. Show that the set {1,2,3,4,5} is not a group under addition modulo 6.

6. Define connected graph and a disconnected graph with example.

7. Explain spanning trees with example.

(4 × 2 = 8 Weightage)

Part-B

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

8. If A and B are sets, prove that A UB = (A-B) UB.

9. Let $f(x) = x+2$, $g(x) = x-2$ and $h(x) = 3x$ for x is in R, where R is the set of real numbers. Find gof, fog, (foh)og, hog.

10. Draw the Hasse diagram for D24 = {1, 2, 3, 4, 6, 8, 12, 24}, D30 = {1, 2, 3, 5, 6, 10, 15, 30}, D36 = {1, 2, 3, 4, 6, 9, 12, 18, 36} considering the partial order divisibility.

11. Prove that the De Morgon's laws hold good for a complemented distributive lattice (L , ^ , V).

12. Determine that the following graph is bipartite or not. If a graph is bipartite, state if it is completely bipartite.
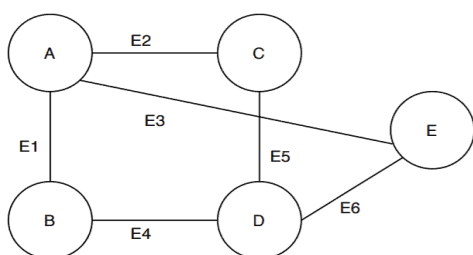
13. Explain Homomorphism and Isomorphism of groups with example.

14. Prove that a given connected graph G is Euler graph if and only if all vertices of G are of even degree.

(4 × 3 = 12 Weightage)

Part-C

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

15. Using rules of inference prove that the following argument is valid.

16. Let D_{30} = {1, 2, 3, 5, 6, 10, 15, 30} and Let the relation R be divisor on D_{30}. Find
    1. All lower bounds of 10 and 15.
    2. The GLB of 10 and 15
    3. All upper bounds of 10 and 15
    4. LUB of 10 and 15.
    5. Draw the Hasse Diagram.

17. (a) Prove that the order of each subgroup of a finite group G is a divisor of the order of the group G.
    (b) Show that the set{ 0, 1, 2,3,4,5 }is a group under addition and multiplication modulo 6.

18. Discuss Dijkstra"s shortest path algorithm with example.

(2 × 5 = 10 Weightage)

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