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(FOR THE CANDIDATES ADMITTED DURING THE ACADEMIC YEAR 2022 ONLY)

22UCS2A1

REG.NO

NGM COLLEGE (AUTONOMOUS) POLLACHI

END-OF-SEMESTER EXAMINATIONS: MAY- 2023

B. Sc-COMPUTER SCIENCE (Aided & SF) **MAXIMUM MARKS: 50**

II SEMESTER **TIME: 3 HOURS**

PART - III

ALLIED-2: DISCRETE MATHEMATICS LEVEL-I

SECTION – A (10 X 1 = 10 MARKS)

ANSWER THE FOLLOWING QUESTIONS. (K1)

1. _____ is a compound statement if it is true for all truth value assignments for its component statements
   a) Logic b) Tautology
   c) Contradiction d) None of the above

2. Fuzzy set A is called a _____ of fuzzy set B when A is a subset of B and the two sets are not equal
   a) proper subset b) equal subset
   c) Cardinality d) membership

3. A_____ is a set S with a relation R on it which is reflexive, anti-symmetric, and transitive.
   a) equivalent set b) ordered set
   c) implicit set d) Partially ordered set

4. a * H = H * a relation holds if _____
   a) h is semigroup of an abelian group b) h is monoid of a group
   c) h is subgroup of an abelian group d) h is a cyclic group

5. The problem of finding a path in a graph that visits every vertexexactly once is called_____
   a) Hamiltonian path problem b) Hamiltonian cycle problem
   c) subset sum problem d) turnpike reconstruction problem

ANSWER THE FOLLOWING IN ONE (OR) TWO SENTENCES (K2)

6. What is disjunctive normal form of given formula?
7. What is meant by Domain and Range of a relation?
8. What is a poset in math?
9. State any two properties of a group
10. What is a simple graph?

(CONTD …. 2)

SECTION – B (5 X 3 = 15 MARKS)

ANSWER EITHER (a) OR (b) IN EACH OF THE FOLLOWING QUESTIONS.

(K3)

11. (a) Prove the De Morgan's equivalence law using TT
    (¬(PVQ)↔ (¬P Λ¬Q)
    (¬(P Λ Q)↔ (¬P V ¬Q)

    (OR)

    (b) What is predicate calculus? Explain

12. (a) Summarize the properties of relations

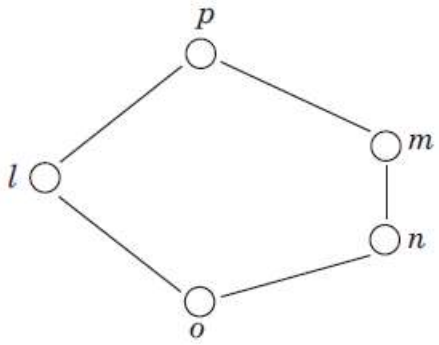
    (OR)

    (b) Differentiate Fuzzy relation and crisp relation

13. (a) Let f :R → R be given by f(x) = x3− 2. Find f−1

    (OR)

    (b) Show that lattice is not a distributive lattice



14. (a) Let (A, ∗) be a semi group. Show that for a, b, c in Aif a ∗c = c ∗a and b ∗c = c ∗b, then (a ∗b)
    ∗c =c ∗(a ∗b).

    (OR)

    (b) What is meant by phrase structure grammar?

15. (a) Prove that, if G is a tree with n vertices then G has n-1 edges

    (OR)

    (b)Prove that a connected graph is a circuit if the degree of each vertex is 2.

SECTION – C (5 X 5 = 25 MARKS)

ANSWER EITHER (a) OR (b) IN EACH OF THE FOLLOWING QUESTIONS.

(K4 (Or) K5)

16. (a) Discuss the principals of conjunctive and disjunctive normal forms

    (OR)

    (b) Discuss briefly the equivalence of propositions with example

17. (a) If R and S are equivalence relations on a set A, prove that R ∩ S is an equivalence relations in A

    (OR)

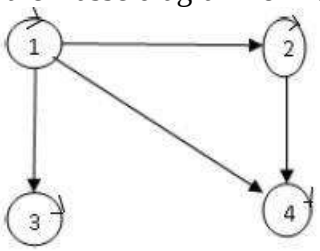
    (b) Discuss the Fuzzy Union and Fuzzy Intersection operations and its axioms

(CONTD …. 3)

18. (a) Let X = {1, 2, 3, 4} and f and g be functions from X to X given by f = {(1, 4), (2, 1), (3, 2), (4, 3)}
and g = {(1, 2), (2, 3), (3, 4), (4, 1)}. Prove that f and g are inverses of each other

(OR)

(b) (i). A partial order R on the set A = {1, 2, 3, 4} is represented by the following digraph. Draw the Hasse diagram for R.



(ii). Show that the inclusion ⊆is a partial ordering on the set power set of a set S.

19. (a) Discuss the Homomorphism of semi groups and monoids

(OR)

(b)Summarize the different types of phrase structure grammar

20. (a) Explain the adjacency and incidence matrix representation with suitable graph

(OR)

(b)Discuss the algorithm of Shortest Path between all pairs of vertices

ETHICAL PAPER

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