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(FOR THE CANDIDATES ADMITTED **25UCS2A1**

DURING THE ACADEMIC YEAR 2025 ONLY) **REG.NO. :** _____

N.G.M. COLLEGE (AUTONOMOUS): POLLACHI

END-OF-SEMESTER EXAMINATIONS: MAY- 2026

B.Sc. -COMPUTER SCIENCE(AIDED & SF) **MAXIMUM MARKS: 75**

SEMESTER: II **TIME: 3 HOURS**

PART - III

25UCS2A1– VEDIC AND DISCRETE MATHEMATICS

SECTION – A (10 X 1 = 10 MARKS)

ANSWER THE FOLLOWING QUESTIONS. (K1)

1. Which Vedic sutra is mainly used for subtraction in the "All from 9 and last from 10" method?

a) Urdhva Tiryak b) Nikhil am Navatashcaramam Dashrath

c) Ekadhikena Purvena d) Shun yam Samyasamuccaye

2. The process of "Vertical and Crosswise" multiplication is mainly useful for_____

a) Large numbers multiplication b) Finding cubes

c) Division d) Subtraction

3. The duality law in propositions states that_____

a) Every proposition has an inverse

b) Interchanging AND ↔ OR and 0 ↔ 1 gives dual statement

c) Every tautology is false d) There are no duals in propositional algebra

4. The equivalence classes of a set under an equivalence relation is _____

a) Overlap each other b) Partition the set

c) Contain at least one element of the set d) Are always empty

5. The degree of a vertex in a graph is_____

a) Number of edges in the graph b) Number of edges incident on the vertex

c) Maximum distance from the vertex d) Number of vertices connected to it

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

6. Define Vedic Mathematics.

7. What is the Transpose and their applying method in Vedic Division?

8. Prove that $((p \rightarrow (\sim p)) \rightarrow \sim p)$ is tautology.

9. Draw the Hasse diagram for the relation "x divides y" on {1,2,3,6,12.18}.

10. Define connectedness in directed graphs.

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SECTION – B (5 X 5 = 25 MARKS)

ANSWER EITHER (a) OR (b) IN EACH OF THE FOLLOWING QUESTIONS. (K3)

11. a) Explain how subtraction becomes easy when the minuend is a power of 10**.** Using Vedic method, Find 1,00,000 − 56,849.

(OR)

b) Multiply 106*105*109

12. a) Multiply using Urdhva Tiryak 12345 × 67890

(OR)

b) Find the division of 1358 by 12

13. a) Show that $\sim (P \wedge Q) \rightarrow (\backsim P \vee (\backsim P \vee Q)) \Leftrightarrow (\backsim P \vee Q)$

(OR)

b) If $f: R \rightarrow R$ and $g: R \rightarrow R$ are function defined by $f(x) = x^3 + 3x + 1$ and $g(x) = 2x - 3$,find $f \circ g$, $g \circ f$, $f \circ f$, $g \circ g$.

14. a) Define Equivalence classes and explain equivalence classes with an example.

(OR)

b) Show that the set of idempotent elements of a commutative monoid {M, *, e} forms a sub monoid of M.

15. a) Explain in detail the Matrix representation of a Graph with an example.

(OR)

b) Explain Dijkstra's algorithm with a worked example

SECTION – C (5 X 8 = 40 MARKS)

ANSWER EITHER (a) OR (b) IN EACH OF THE FOLLOWING QUESTIONS.(K4 (Or) K5)

16. a) Explain Vedic Method of addition and also add 389 from 567 by Mi shrank Method.

(OR)

b) Multiply 104*106*1058

17. a) Divide 72 38 761 by 524?

(OR)

b) Find the square root of 734449.

18. a) Obtain the PDNF of $(p \wedge q) \vee (\backsim p \wedge r) \vee (q \wedge r)$.

(OR)

b) Obtain the PCNF of $(p \rightarrow (q \wedge r)) \wedge (\backsim p \rightarrow (\backsim q \wedge \backsim r))$.

19. a) Let $S = \{1, 2, 3, 4, 5\}$ and let $A = S \times S$. Define the following relation R on A: $(a, b), R(a', b') \; iff \; ab' = a'b$.
(i) Show that R is an equivalence relation.
(ii) Compute A/R. **(OR)**
b) Prove that the set Q_0 of all non-zero rational number forms a group under the operation of multiplication of rational numbers.

20. a) Prove that an indirected graph is Eulerian iff it is connected and all vertices are of even degree.

(OR)

b) Find the maximum number of edges in a simple connected graph with n vertices and components.

Ethical paper

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