(FOR THE CANDIDATES ADMITTED

DURING THE ACADEMIC YEAR 2023 ONLY)   REG.NO. :

23UAI3A1

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

END-OF-SEMESTER EXAMINATIONS : NOVEMBER- 2024

BSc CS (AI & ML)   **MAXIMUM MARKS: 75**

SEMESTER III   **TIME : 3 HOURS**

PART - III

23UAI3A1 – DISCRETE STRUCTURES AND ITS APPLICATIONS

SECTION – A   (10 X 1 = 10 MARKS)

ANSWER THE FOLLOWING QUESTIONS.

1. The binary relation {(1,1), (2,1), (2,2), (2,3), (2,4), (3,1), (3,2)} on the set   **(K1)**

   {1, 2, 3} is _____

        a) reflexive, symmetric and transitive

        b) irreflexive, symmetric and transitive

        c) neither reflexive, nor irreflexive and not transitive

        d) irreflexive and antisymmetric

2. What is the minimal Hamming distance between any two correct codewords?   **(K1)**

        a) 1   b) 2   c) 3   d) 4

3. If A is any statement, then which of the following is a tautology?   **(K1)**

        a) $A \wedge F$ b) $A \vee F$ c) $A \vee \neg A$ d) $A \wedge T$

4. If each and every vertex in G has degree at most 23 then G can have a vertex   **(K1)**

   colouring of _____

     a) 24   b) 23   c) 176   d) 54

5. The linear combination of gcd (252, 198) = 18 is?_____   **(K1)**

     a) 252*4 – 198*5   b) 252*5 – 198*4

     c) 252*5 – 198*2   d) 252*4 – 198*4

ANSWER THE FOLLOWING IN ONE (OR) TWO SENTENCES

6. Define Cartesian product.   **(K2)**

7. What is hamming distance?   **(K2)**

8. Define Tautology.   **(K2)**

9. Illustrate the compound statements.   **(K2)**

10. Find the number of trailing zeros in the 100!.   **(K2)**

Ethical paper

SECTION – B **(5 X 5 = 25 MARKS)**

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

11.　　a) Describe Cartesian product of two sets　　　　　　　**(K3)**

　　　　　　(OR)

　　　　b) Find the Equivalence of Relation　　　　　　　**(K3)**

12.　　a) Discover Procedure for Generating Group Codes　　　**(K3)**

　　　　　　(OR)

　　　　b) Apply an example of Simple Error Correcting Code　**(K3)**

13.　　a) Describe Well Formed (Statement) Formulae　　　　**(K3)**

　　　　　　(OR)

　　　　b) Explain Tautological implications　　　　　　　**(K3)**

14.　　a) Describe the Operations on Graphs　　　　　　　**(K3)**

　　　　　　(OR)

　　　　b) Explain Krushkal's algorithm to find an optimal tree of a weighted graph.　　**(K3)**

15.　　a) Illustrate the Euclidean Algorithm　　　　　　　**(K3)**

　　　　　　(OR)

　　　　b) Explain Unique Factorization Theorem.　　　　　**(K3)**

SECTION – C **(5 X 8 = 40 MARKS)**

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

16.　　a) Analyze the importance of Warshall's Algorithm.**(K4)**

　　　　　　(OR)

　　　　b) Elucidate Partitions and Equivalence Classes.　**(K5)**

17.　　a) Classify Decoding and Error Correction.　　　　**(K4)**

　　　　　　(OR)

　　　　b) Examine Procedure for Generating Group Codes.　**(K5)**

18.　　a) Explain the Normal forms.　　　　　　　　　　**(K4)**

　　　　　　(OR)

　　　　b) Illustrate Tautological equivalence of a formula.　**(K5)**

19.　　a) Investigate the spanning trees of Graph.　　　**(K4)**

　　　　　　(OR)

　　　　b) Illustrate algorithm for finding a spanning tree of a connected graph.　**(K5)**

20.　　a) Interpret the Greatest Common Divisor.　　　**(K4)**

　　　　　　(OR)

　　　　b) Explain the Euclid's Theorem.　　　　　　　**(K5)**

Ethical Paper　　　　　************************