

Register No.: Name:

SAINTGITS COLLEGE OF ENGINEERING (AUTONOMOUS)

(AFFILIATED TO APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

SECOND SEMESTER INTEGRATED MCA DEGREE EXAMINATION (Special), AUGUST 2021**Course Code: 20IMCAT104****Course Name: INTRODUCTION TO DISCRETE MATHEMATICS****Max. Marks: 60****Duration: 3 Hours****PART A***(Answer all questions. Each question carries 3 marks)*

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|--|-----------|
| 1. Describe the Logical operators Disjunction and Conjunction with truth table. | [1] |
| 2. Check whether the following argument is valid or not $[p \rightarrow q, q] \rightarrow p$ | [1] |
| 3. Describe the principle of mathematical induction | [2] |
| 4. Show that among a group of 85 students 8 or more students born in the same month | [2] |
| 5. Find the Gcd and Lcm of $2^23^35^5$ and $2^53^35^2$ | [3] |
| 6. Find the inverse of 3 under addition modulo 7. | [3] |
| 7. Explain isomorphism of two graphs. Give example. | [4] |
| 8. Explain Euler graph and state the necessary and sufficient condition for Euler graph | [4] |
| 9. Describe Tree traversal and what are the types of tree traversal | [5] |
| 10. Define m-ary tree, binary tree and full m-ary tree | [5] |

PART B*(Answer one full question from each module, each question carries 6 marks)***MODULE I**

- | | CO | Marks |
|---|-----------|--------------|
| 11. Differentiate between Tautology and Contradiction check whether the following is a tautology or contradiction
$p \vee (q \wedge r) \leftrightarrow (p \vee q) \wedge (p \vee r)$ | [1] | (6) |

OR

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|---|-----------|--------------|
| 12. Show that the hypothesis "If it does not rain or it is not foggy then the sailing race will be held and the life saving demonstration will go on". "If the sailing race is held then the trophy will be awarded". "The trophy was not awarded". Imply the conclusion " It rained" | [1] | (6) |

MODULE II

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|--|-----------|--------------|
| 13. Use mathematical induction to show that $H_2^n \geq 1 + \frac{n}{2}$ whenever n is a nonnegative integer | [2] | (6) |

OR

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|-----|--|-----------|--------------|
| | | CO | Marks |
| 14. | State strong form of mathematical induction. Show that if n is an integer greater than 1 then n can be written as the product of primes. | [2] | (6) |

MODULE III

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|-----|---|-----------|--------------|
| | | CO | Marks |
| 15. | Evaluate $\gcd(4076, 1024)$ and express $\gcd(4076, 1024)$ as a linear combination of 4076 and 1024 | [3] | (6) |

OR

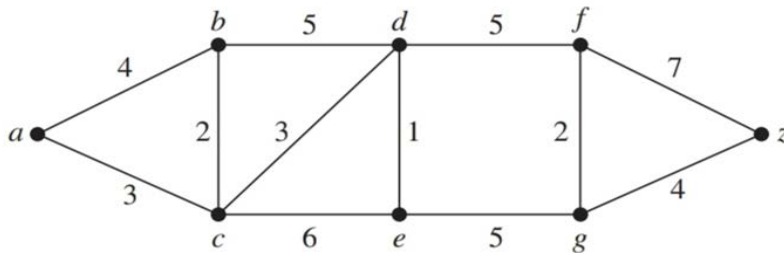
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|-----|--|-----------|--------------|
| | | CO | Marks |
| 16. | State Chinese Remainder Theorem. Solve the following linear congruences
$x \equiv 2 \pmod{3}$
$x \equiv 1 \pmod{4}$
$x \equiv 3 \pmod{5}$ | [3] | (6) |

MODULE IV

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|-----|--|-----------|--------------|
| | | CO | Marks |
| 17. | Define even and odd vertex of a graph. Show that the number of odd vertices in a graph is even | [4] | (6) |

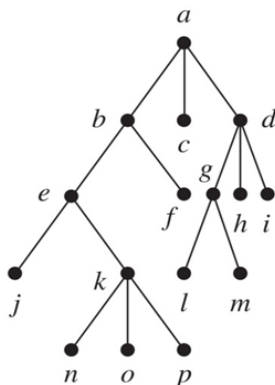
OR

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|-----|---|-----------|--------------|
| | | CO | Marks |
| 18. | Find the length of the shortest path between a and z from the following graph | [4] | (6) |



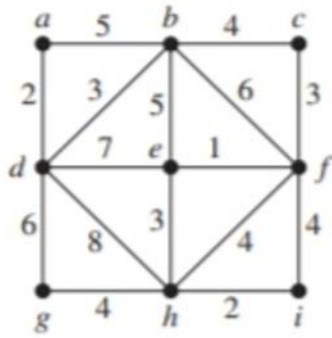
MODULE V

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|-----|--|-----------|--------------|
| | | CO | Marks |
| 19. | Find the preorder, inorder and postorder transversal of the following tree | [5] | (6) |



OR

20. Use Prim's algorithm to find a minimum spanning tree of the graph shown below



[5]

(6)
