

**II.B.TECH-II-SEM-II MID EXAMINATIONS                            Date:** 07-05-2025

**Subject: Discrete Mathematics                                                       Time:** 01:30pm to 03:30pm

**Branch: Common to IT, CSE-DS                                           Marks: 30M**

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**Answer all the Questions. Each Question carries equal marks** **2\*5=10 Marks**

1. **Write** about Isomorphisms and Sub graphs. (CO5)

2. In how many ways can the letters of the English alphabet be arranged so that there are exactly 5 letters between the letters a and b?(CO4)

3. **Discuss** about Trees and their properties. (CO5)

4. How many ways can we get a sum of 8 when two indistinguishable dice are rolled? An even Sum? (CO4)

5**. Define** Monoid**,** Homomorphism of semigroup. (CO3)

**Answer Any 4 Questions. Each Question carries equal marks 5\*4=20 Marks**

6. **Explain** about Euler Graphs and Hamiltonian Graphs with Examples of each.(CO5)

7. **Explain** the properties of Algebraic Systems and **Show that G= {1,-1,I,-i} is an Abelian group** under multiplication**.** (CO3)

8**.** a) **Explain** in detail about the Binomial theorem. (3 Marks) (CO4)

    b) **Explain** in detail about the Multinomial theorem**.** (2 Marks)(CO4)

9. **Define graph**. Graph G is represented by the following adjacency

      matrix [0 111010101110011000101110] (CO5)

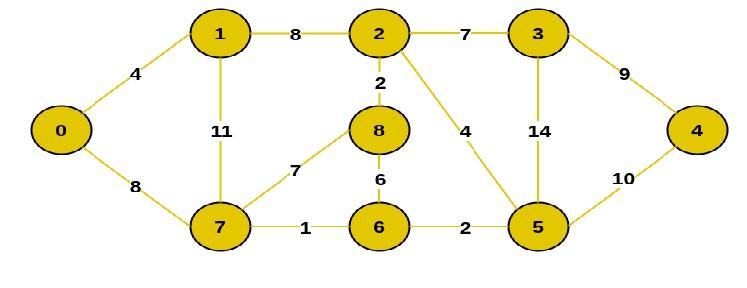
a) Draw the graph. (1Mark)

b) Determine whether G is a tree .justify your answer. (1Mark)

c) Determine whether G is a Eulerian graph. Justify your answer. (1.5 Marks)

d) Determine whether G is Hamiltonian Graph. If it is so, Provide a Hamiltonian cycle on G.                                                           (1.5 Marks)

10. Find the minimum spanning tree by using prim’s algorithm. (CO5)



11 a) Explain Permutations and Combinations with examples. (3Marks) (CO4)

b) How many different outcomes are possible by tossing 10 similar coins and from tossing 10 similar dice? (2Marks) (CO4)

**Schema for Evaluation**

**Part –A**

| **SNO** | **THEORY** | **MARKS** | **TOTAL** |
| --- | --- | --- | --- |
| **1** | **Write** about Isomorphisms and Sub graphs | **2** | **2** |
| **2** | In how many ways can the letters of the English alphabet be arranged so that there are exactly 5 letters between the letters a and b? | **2** | **2** |
| **3** | **Discuss** about Trees and their properties. | **2** | **2** |
| **4** | How many ways can we get a sum of 8 when two indistinguishable dice are rolled? An even Sum? | **2** | **2** |
| **5** | **Define** Monoid**,** Homomorphism of semigroup. | **2** | **2** |

**Part –B**

| **SNO** | **THEORY** | **MARKS** | **TOTAL** |
| --- | --- | --- | --- |
| **6** | **Explain** about Euler Graphs and Hamiltonian Graphs with Examples of each. | **5** | **5** |
| **7** | **Explain** the properties of Algebraic Systems and **Show that G= {1,-1,I,-i} is an Abelian group** under multiplication**.** | **5** | **5** |
| **8** | a) **Explain** in detail about the Binomial theorem.  b) **Explain** in detail about the Multinomial theorem**.** | **3**  **2** | **5** |
| **9** | 9. **Define graph**. Graph G is represented by the following adjacency matrix [0 111010101110011000101110] a) Draw the graph.  b) Determine whether G is a tree .justify your answer  c) Determine whether G is a Eulerian graph. Justify your answer.  d) Determine whether G is Hamiltonian Graph. If it is so, Provide a Hamiltonian cycle on G. | **1**  **1**  **1.5**  **1.5** | **5** |
| **10** | Find the minimum spanning tree by using prim’s algorithm.  MST1.jpg | **5** | **5** |
| **11** | a) Explain Permutations and Combinations with examples.  b) How many different outcomes are possible by tossing 10 similar coins and from tossing 10 similar dice? | **3**  **2** | **5** |