Indian Institute of Information Technology-Vadodara
MA 114: Introduction to Discrete Mathematics
Mock test

Instructions

i. Answer new question on new page.

ii. Write down your name and Roll no. on each page in your own handwriting.

iii. If possible answer questions sequentially.

iv. Each question carries 5 marks.

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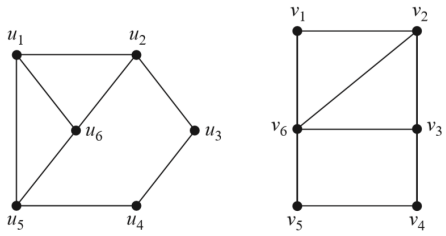
1. Are following graphs isomorphic? Explain.



2. Let n be your student id. Is it divisible by 6? If yes then give reason, else give remainder modulo 6.

3. What is the cardinality of the set- $\{0, 1\} \times \mathbb{N}$? Explain.

4. Find all solutions of the recurrence relation $a_n = 5a_{n-1} - 6a_{n-2} + 2^n + 3n$.

5. Suppose that there are m men and n women on an island. Each person has a list of members of the opposite gender acceptable as a spouse. We construct a bipartite graph $G = (V_1, V_2)$ where V_1 is the set of men and V_2 is the set of women so that there is an edge between a man and a woman if they find each other acceptable as a spouse. A matching in this graph consists of a set of edges, where each pair of endpoints of an edge is a husband-wife pair. A maximum matching is a largest possible set of married couples, and a complete matching of V_1 is a set of married couples where every man is married, but possibly not all women.
   Find a necessary and sufficient condition for complete matching.