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| **xP.V.P Siddhartha Institute of Technology(Autonomous)** | | | | | | | | | |
| **Department of Computer Science and Engineering** | | | | | | | | | |
| **Course: B.Tech** | | **Year: II** | **Semester: I** | | **Descriptive: II** | | **A.Y:2024-25** | | |
| **Subject Code: 23BS1305** | | **Subject Name: Discrete Mathematics and Graph Theory (DM&GT)** | | | | | **Regulation:PVP23** | | |
| **Duration:1 hr 30 min** | | **Maximum Marks:30 Marks** | | **Date:26-11-2024** | | | **Session: F.N** | | |
| **Answer one from each either-or type of Questions.**  **Each Question carries 10 Marks**  **3×10M=30M** | | | | | | | | | |
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| **Q.No** |  | | | | | **Marks** | | **CO** | **Level** |
| 1.(a) | Solve the recurrence relation usingcharacteristics method with initial conditions a0=2 and a1=5. | | | | | 5M | | CO3 | L3 |
| (b) | Solve an - 5an-1 + 6an-2 = 2n  , n > 2 with condition the initial a0 = 1 , a1 = 1. | | | | | 5M | | CO3 | L3 |
| **(OR)** | | | | | | | | | |
| 2.(a) | Solve an - 5an-1 + 6an-2 = 0 , n 2 with initial conditions a0 = 1 ,  a1 = -2. | | | | | 5M | | CO3 | L3 |
| (b) | Solve the recurrence relationusingcharacteristics method with initial conditions. | | | | | 5M | | CO3 | L3 |
|  | | | | | | | | | |
| 3.(a) | Let Z denote the set of integers and the relation R on Z be defined by a R b if and only if (a – b) is an integer. Show that R is an equivalence relation. | | | | | 5M | | CO4 | L2 |
| (b) | Let 𝐴 = {𝑎, 𝑏, 𝑐, d} and P (𝐴) be its power set. Construct the Hasse diagram of (P (𝐴), ⊆). | | | | | 5M | | CO4 | L3 |
| **(OR)** | | | | | | | | | |
| 4.(a) | Let R = {( a, b), (b, c), (c, d), (b, a)} be a relation on A = {a, b, c , d }  Using Warshall’s algorithm find the transitive closure of R? | | | | | 5M | | CO4 | L3 |
| (b) | Examine, whether the following graphs are isomorphic or not? Justify your answer. | | | | | 5M | | CO4 | L4 |
|  | | | | | | | | | |
| 5.(a) | Explain the following with examples  i. Complete graph ii. Planar graph iii. Multigraphs  iv. Euler Graph v. Hamiltonian graph | | | | | 5M | | CO4 | L2 |
| (b) | Discover the chromatic number of the following graphs using Welch Powell Algorithm. | | | | | 5M | | CO4 | L4 |
| **(OR)** | | | | | | | | | |
| 6.(a) | Apply the Breadth First Search Algorithm (BFS) for the following graph to construct a Spanning Tree. | | | | | 5M | | CO4 | L3 |
| (b) | Discover a Minimal Spanning Tree (MST) for the given weighed graph shown below using Prim’s algorithm.  Prim's Algorithm for Minimum Spanning Tree (MST) | by Sandhya Morla | Medium | | | | | 5M | | CO4 | L4 |
|  |  | | | | |  | |  |  |