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| **P.V.P SIDDHARTHA INSTITUTE OF TECHNOLOGY (AUTONOMOUS)** |
| **BRANCH : Computer Science and Engineering** | **REGULATION : PVP23** |
| **Course: B.Tech** | **SUBJECT : Discrete Mathematics & Graph Theory** |
| **SubjectCode:23BS1305** | **Year and Semester: II Year / I Sem** | **Section: I/II/III** |
| **Academic Year:2024-25 (Semester-I)** |
| **ASSIGNMENT-II** |

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| **Q.NO** | **QUESTION** | **CO** | **LEVEL** |
| **1.** | **A).** Solve an - 5an-1 + 6an-2 = 2n , n > 2 with condition the initial a0 = 1 ,  a1 = 1.**B).** **.** | **3** | **L3** |
| **2.** | **A).** Solve the recurrence relation**B).** Solve the following recurrence relation an +an-1- 6an-2 =0 for n≥2, given that a0 = -1 and a1 =8. | **3** | **L3** |
| **3.** | **A).** Solve the recurrence relation usingcharacteristics method with initial conditions a0=2 and a1=5.**B).** Solve the recurrence relationusing characteristics method with initial conditions. | **3** | **L3** |
| **4.** | **A).** Let R = {( a b ), (b ,c ), (c ,d ), (b ,a )} be a relation on A = {a ,b ,c ,d } Find the transitive closure of R.**B).** Let A be a given finite set and P(A) its power set . let ⊆ be the inclusion relation on the elements of P(A).Construct the Hass diagram of  (P(A) , ⊆ ) for  i) A = { a } ii) ) A ={ a ,b} iii) A = { a, b, c } iv) ) A = { a, b, c ,d } | **4** | **L3** |
| **5.** | **A).** Let S150 be the set of all divisors of 150. Let the relation ≤ be given by a ≤ b if a│b on S150. 1. Draw the Hasse Diagram for the Poset (S150, |).
2. Find the least element and greatest element of this POSET if it

 exists.1. Find the GLB and LUB of {5, 6, 10, 15}.

**B).** Let Z denote the set of integers and the relation R on Z be defined by  **aRb if and only if (a – b) is an integer**. Show that R is an equivalence  relation. | **4** | **L2** |
| **6.** | **A).** Construct the Hasse Diagram for ,,, where D is the  relation of division.**B).** Construct adjacency matrix of the given directed Multigraph. | **4** | **L3** |
| **7.** | **A).** Examine whether the following graphs are isomorphic or not. Justify your answer?**B).** Examine whether the following graphs are isomorphic or not. Justify your answer?11.4: Graph Isomorphisms - Mathematics LibreTexts | **4** | **L4** |
| **8.** | **A).** Find the chromatic number of the following graphLightbox**B).** Examine whether the following graph is planar or not. Justify your answer. | **4** | **L4** |
| **9.** | **A).** Examine whether the following graph has an Euler circuit.  Construct such a circuit if it exists and determine whether the graph has an Euler path and construct such a path if one exists.**B).** Demonstrate Depth first Search Algorithm with an Example. | **4** | **L4** |
| **10.** | **A).** Using Kruskal’s algorithm ,Discover a minimal Spanning tree for the Weighed graph shown belowKruskal's Algorithm **B).** Define Hamiltonian Graph? Determine whether this graph is a Hamiltonian graph. | **4** | **L4** |

**Write Definitions for the following**

1. Null Graph
2. Trivial Graph
3. Non-directed Graph
4. Directed Graph
5. Connected Graph
6. Disconnected Graph
7. Regular Graph
8. Complete Graph
9. Cycle Graph
10. Cyclic Graph
11. Acyclic Graph
12. Finite Graph
13. Infinite Graph
14. Bipartite Graph
15. Planar Graph
16. Simple Graph
17. Multi Graph
18. Pseudo Graph
19. Euler Graph
20. Hamiltonian Graph