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Progressive Education Society's

Modern college of Arts, Science & Commerce,Ganeshkhind,
Pune 16, NEP 2020 (Autonomous)
End Semester Examination Mar-Apr 2025

Total No. Of Questions:3/15 *Total No. of Pages:4*

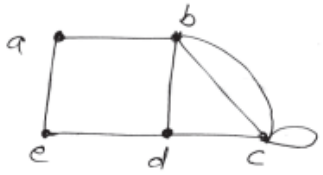
F.Y.B.Sc.(Computer Science)
24CMAT12101 Graph Theory
(Semester II)

Program: BSc(Comp Sci) **Credits: 2**
Program(Specific): Mathematics **Time: 2 Hours**
Course Type: Major **Max. Marks: 30**
Paper No:24CMAT12101 **SET: A**

Instructions To the Candidates:
1. All Questions are compulsory.
2. Figures to the right indicate full marks.
3. Draw a well labelled diagram wherever necessary.

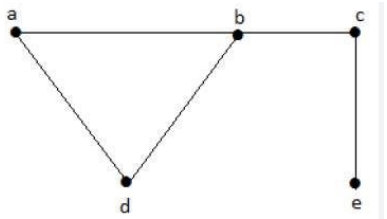
Q.1) Attempt any **FIVE** of the following. $[5 \times 2 = 10]$

a) Verify the Handshaking Lemma for the following graph.



b) Draw the following graphs
i) K_5 ii) 3 Regular Graph

c) In the following graph G, fuse the vertices a and b and draw the resulting graph.



d) Draw any two spanning sub-graphs of the following graph.

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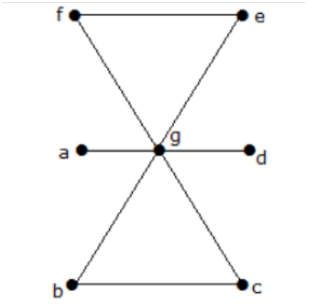
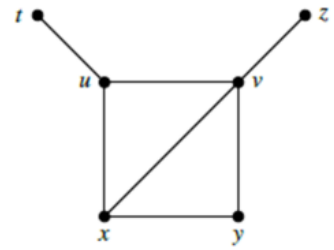


e) Give an example of a graph which is an Eulerian but not Hamiltonian.

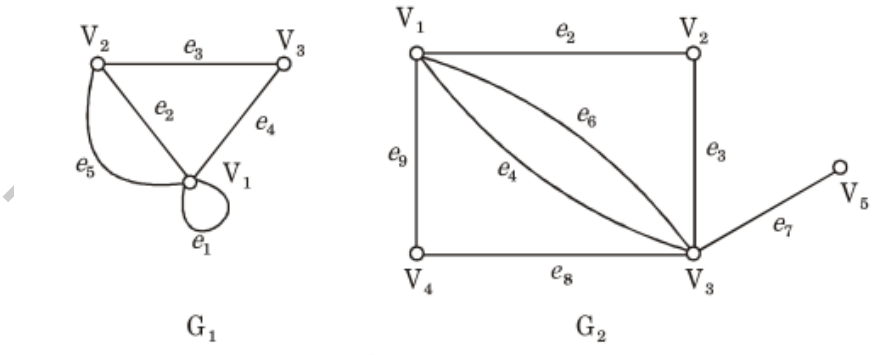
f) Find vertex connectivity $K(G)$ and edge connectivity $\lambda(G)$ of the following graph.



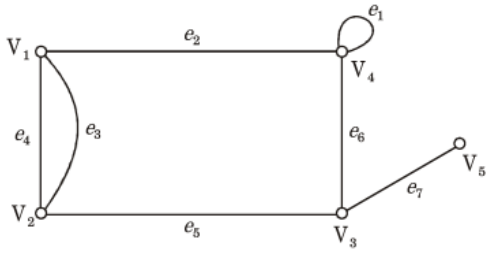
g) Draw any two non-isomorphic binary trees on 11 vertices.

Q.2) Attempt any **THREE** of the following. $[3 \times 4 = 12]$

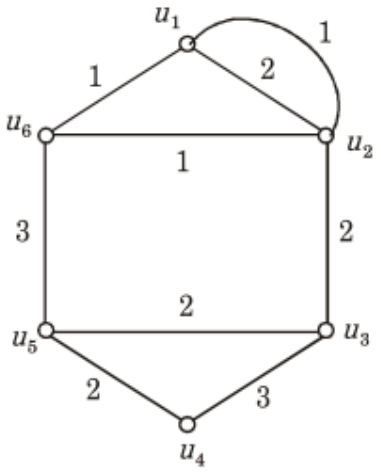
a) Find the union and intersection of the following graphs G_1 and G_2.



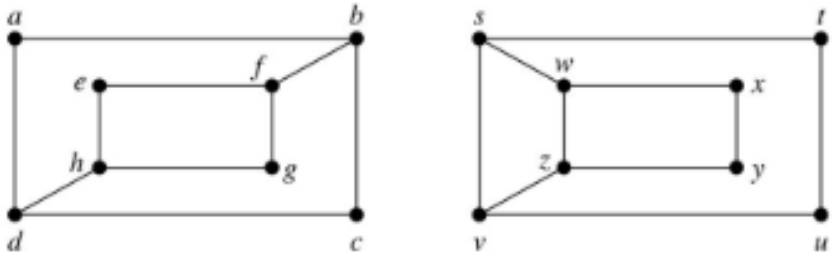
b) Find the adjacency and incidence matrix of the following graph.



c) Using Kruskal's algorithm.Find the minimum weighted spanning tree in the following graph.



d) Check whether the following graphs are isomorphic ? Justify your answer.



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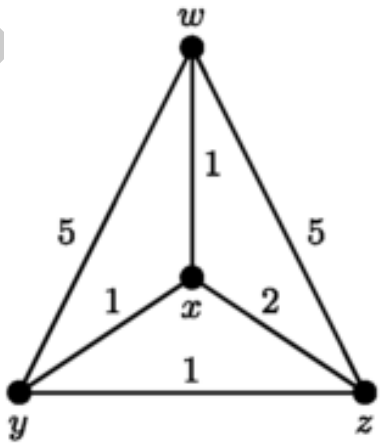
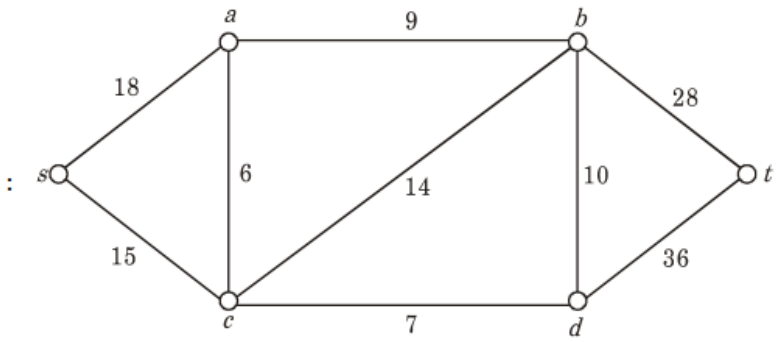
e) Solve the following Traveling Salesman Problem.

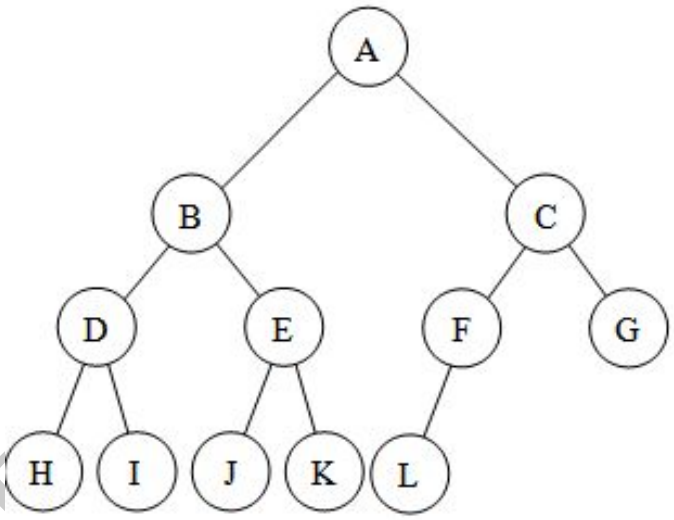


Q.3) Attempt any **ONE** of the following. $[1 \times 8 = 8]$

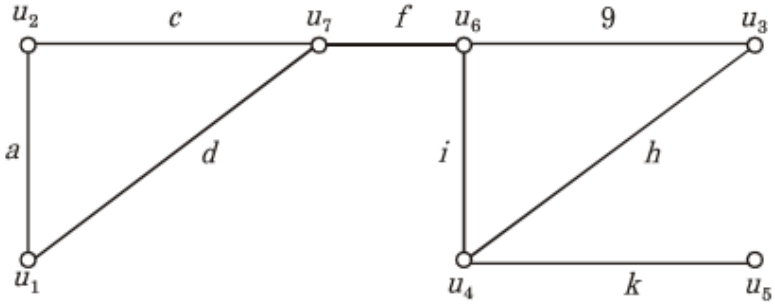
a) Using Dijkstra's algorithm, find the shortest path from s to t in the following graph.



b) i) Write the Preorder traversal sequence and Inorder traversal sequence of the vertices in the following ordered rooted tree?



ii) In the following graph G, find the graph G - F ; where F = $\{u_2, u_6, u_3\}$. Also find the bridges and cut vertices in G.



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