Assignment-08112024

Instructions

- Write your details (name, ID, section, department, etc.) on the first page.
- Upload a PDF version using this link: https://forms.gle/oUGtC1SqqEcYZ4Xz8 by the given deadline.
- Name your PDF file as "YourName_ID" (e.g., Raj_1022).

Deadline: within 08/11/2024

Solve all the problems:

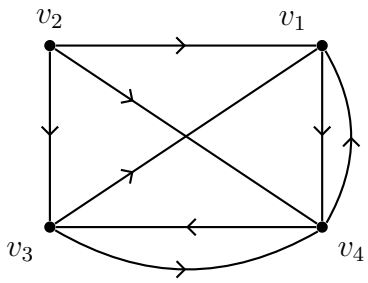
1. Prove that a complete graph with n vertices consists of $\frac{n(n-1)}{2}$ number of edges.
2. Proof that the sum of all degrees is equal to twice the 2e.
3. Prove that any tree with two or more vertices contains at least two pendant vertices.
4. Draw the graph of the following adjacency matrix: (6)

$$\begin{bmatrix} 0 & 1 & 0 & 1 & 0 & 1 \\ 1 & 0 & 1 & 0 & 1 & 0 \\ 0 & 1 & 0 & 1 & 0 & 1 \\ 1 & 0 & 1 & 0 & 1 & 0 \\ 0 & 1 & 0 & 1 & 0 & 1 \\ 1 & 0 & 1 & 0 & 1 & 0 \end{bmatrix}$$

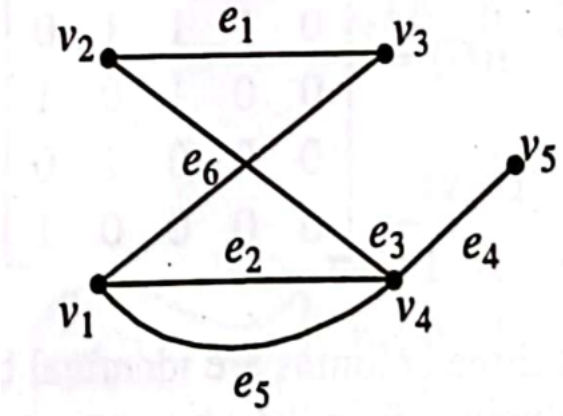
5. Draw the graph of the following adjacency matrix:

$$A(G) = \begin{array}{c} \\ v_1 \\ v_2 \\ v_3 \\ v_4 \\ v_5 \\ v_6 \end{array} \begin{array}{c} \begin{array}{cccccc} v_1 & v_2 & v_3 & v_4 & v_5 & v_6 \end{array} \\ \begin{bmatrix} 0 & 1 & 0 & 0 & 1 & 1 \\ 1 & 0 & 0 & 1 & 1 & 0 \\ 0 & 0 & 0 & 1 & 0 & 0 \\ 0 & 1 & 1 & 0 & 1 & 1 \\ 1 & 1 & 0 & 1 & 0 & 0 \\ 1 & 0 & 0 & 1 & 0 & 0 \end{bmatrix} \end{array}$$

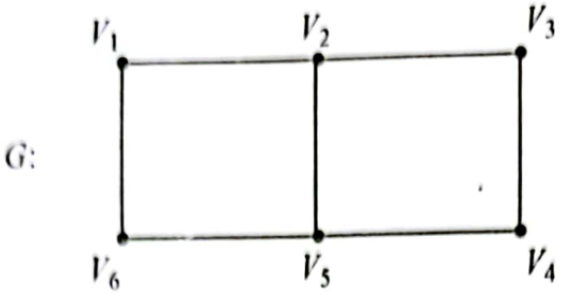
6. Write the incidence matrix of the di-graph.



7. The incidence matrix of the graph G is:

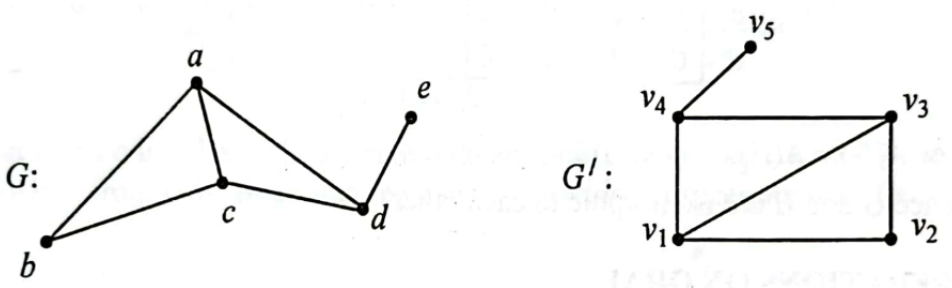


8. A graph G is given below:

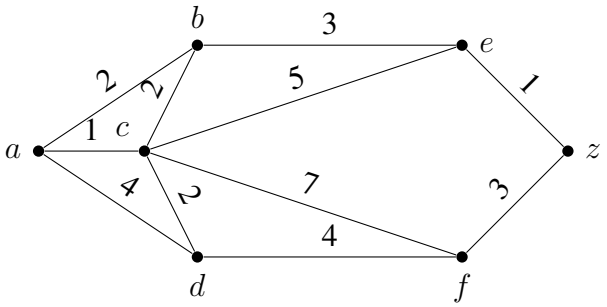


   (a). Find the distance between V_1 and V_4 of G.
   (b). Find the $\dim(G)$.
   (c). Find one circuit which includes V_1.

9. Show that the graphs are isomorphic:



10. Apply shortest path algorithm to determine a shortest path between a to z in the following graph.



11. Obtain a minimal spanning tree of the following graph using Kruskal's Algorithm: