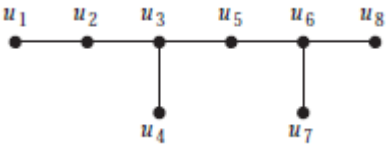
IGT ASSIGNMENT 1

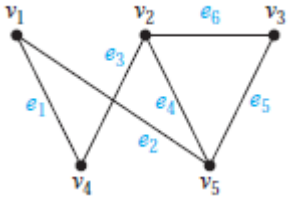
Q.1. Define cut-edge and cut-vertex and determine the cut edges and cut vertices of the following graph.



Q.2. Draw a graph with the adjacency matrix

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

and write the incidence matrix of the following graph.



Q.3. Define the decomposition of a graph and show that K_4 can be decomposed into copies of P_3.

Q.4. An ordered *n*-tuple $(d_1, d_2, ..., d_n)$ with $d_1 \geq d_2 \geq ... \geq d_n$ is called graphic if there exists a simple undirected graph with *n* vertices having degrees d_1, d_2,..., d_n respectively. Which of the following 6-tuples is not graphic? Justify your answer.

(a) 1, 1, 1, 1, 1, 1

(b) 2, 2, 2, 2, 2, 2

(c) 3, 3, 3, 1, 0, 0

(d) 3, 2, 1, 1, 1, 0

Q.5. Define strongly connected and weakly connected graphs and illustrate the difference between them with suitable examples.