Q5

Starting vertex is 0

vertex	0	1	3	4	5	2
Parent	0	0̶ 3	0̶ 0	0̶ 0̶ 5	4 0̶	5 0̶
weight	0 ∞	0̶ 15 9	0̶ 5	0̶ 10̶ 8	16̶ 2	22̶ 3

The shortest paths.

For,

0	1	2	3	4	5
0	3	5	0	5	4
	4	3	5	8	2

dis
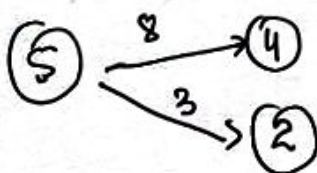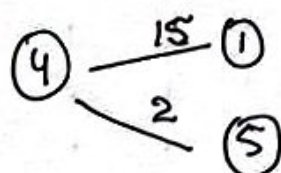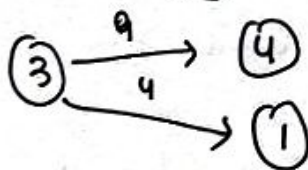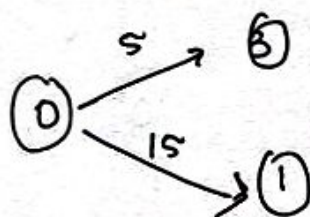
(0) $\xrightarrow{5}$ (3) $\xrightarrow{4}$ (0) = 9

(0) $\xrightarrow{5}$ (3) $\xrightarrow{9}$ (4) $\xrightarrow{2}$ (5) $\xrightarrow{3}$ (2) = 19

(0) $\xrightarrow{5}$ (3) = 5

(0) $\xrightarrow{5}$ (3) $\xrightarrow{9}$ (4) = 14

(0) → (3) → (4) → (5) = 16

P. no. 1

b)

$$\begin{array}{c} & \begin{array}{ccccc} 0 & 1 & 2 & 3 & 4 \end{array} \\ \begin{array}{c} 0 \\ 1 \\ 2 \\ 3 \\ 4 \end{array} & \left[\begin{array}{ccccc} 0 & 1 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 1 & 1 \\ 1 & 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \end{array}\right] \end{array}$$

Graph →
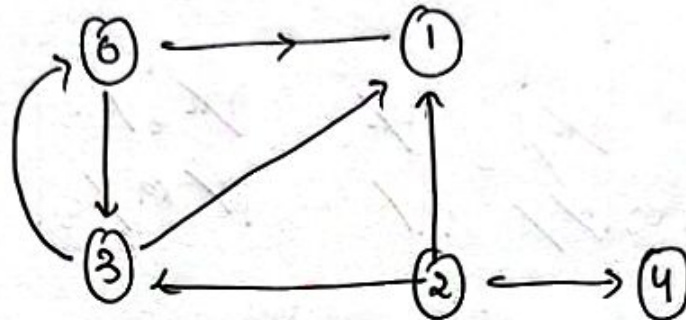
i)

Vertex	Indegree	Outdegree
0	1	2
1	3	0
2	0	3
3	2	2
4	1	0

ib)
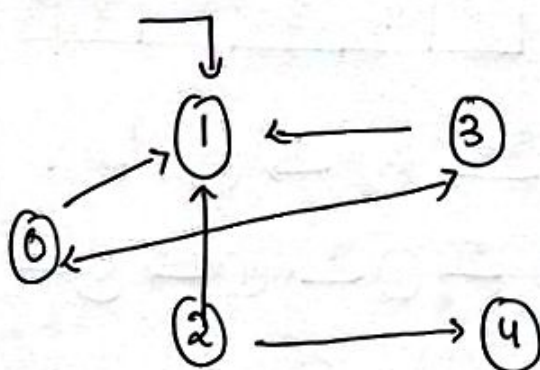
Path matrix is

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

iii) It is not strongly connected

iv) It is acyclic