

Name: Shivam Tawari

Subj: Graph Theory & Number System

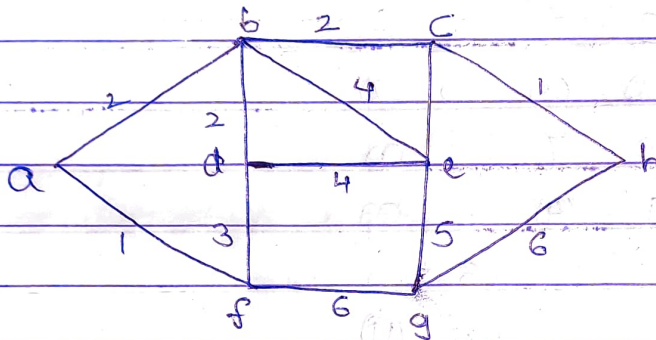
Branch: Artificial Intelligence

Section: A

Roll no: 58

Q.1.

①



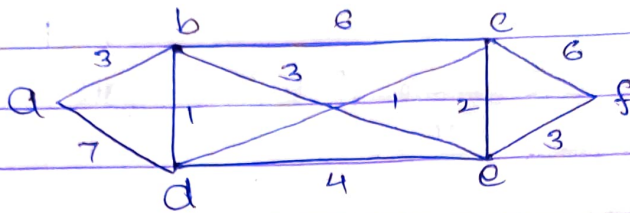
between a & h

	a	b	c	d	e	f	g	h
a	0	∞	∞	∞	∞	∞	∞	∞
f		2	∞	∞	∞	∞ ①	∞	∞
b		②	∞	4	∞		7	∞
c			④	4	6		7	
d				④	6		7	5
→ h					6		7	⑤
e					⑥		7	
g							⑦	

The shortest path between a & h is a-b-c-h.
and the path weight is = 5.

Shivam Tawari ①

②

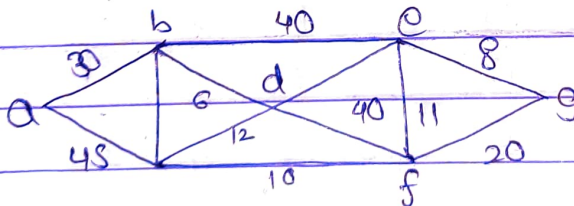


between a & f :

	a	b	c	d	e	f
a	①	∞	∞	∞	∞	∞
b		③	∞	7	∞	∞
d			9	④	6	∞
c			⑤		6	∞
e					⑥	⑪
f						⑪

The path between a & f is a-b-d-c-f
and the path weight is 11.

③

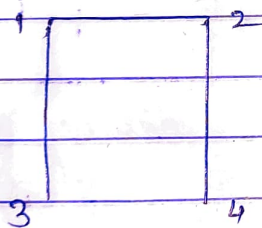


between a & g.

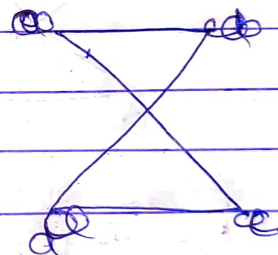
	a	b	c	d	e	f	g
a	0	∞	∞	∞	∞	∞	∞
b		30	45	∞	∞	∞	∞
d			45	36	70	∞	∞
c			45		70	76	∞
f					70	55	∞
e					66		75
→ g							74

The shortest path between a to g is $a \rightarrow c \rightarrow f \rightarrow e \rightarrow g$ and the weight is $45 + 10 + 11 + 8 = 74$.

Q. 2.
①



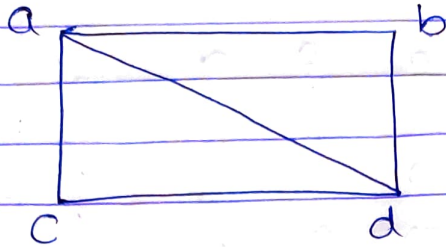
②



	1	2	3	4
1	0	1	1	0
2	1	0	0	1
3	1	0	0	0
4	0	1	0	0

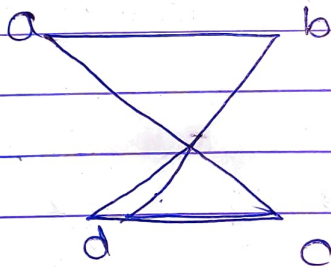
Handwritten signature and page number 3.

②



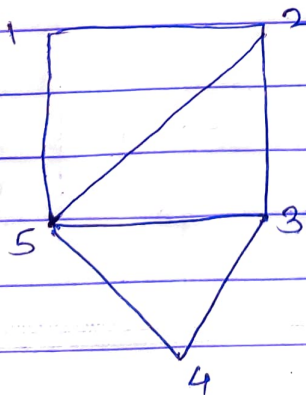
	a	b	c	d
a	0	1	1	1
b	1	0	0	1
c	1	0	0	1
d	1	1	1	0

③



	a	b	c	d
a	0	1	1	0
b	1	0	1	1
c	1	0	0	1
d	0	1	1	0

④



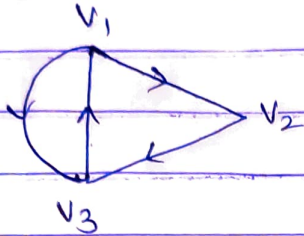
	1	2	3	4	5
1	0	1	0	0	1
2	1	0	1	0	1
3	0	1	0	1	1
4	0	0	1	0	1
5	1	1	1	1	0

Handwritten signature

④

Q.3.

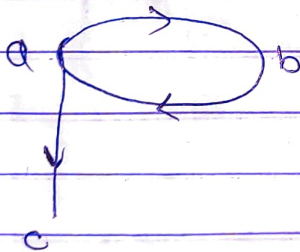
①



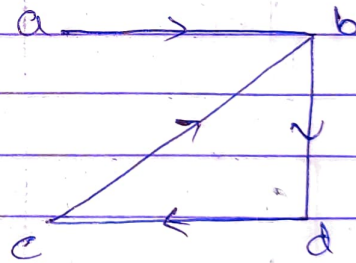
Diagraph adjacency matrix

	v_1	v_2	v_3
v_1	0	1	1
v_2	0	0	1
v_3	1	0	0

②



③



	a	b	c
a	0	1	1
b	1	0	0
c	0	0	0

	a	b	c	d
a	0	1	0	0
b	0	0	0	1
c	0	1	0	0
d	0	0	1	0

Q.4.

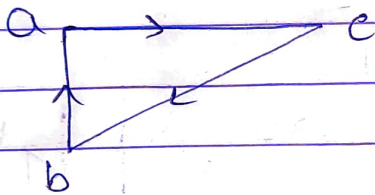
①

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

Let

$$A = \begin{matrix} & \begin{matrix} a & b & c \end{matrix} \\ \begin{matrix} a \\ b \\ c \end{matrix} & \begin{bmatrix} 0 & 0 & 1 \\ 1 & 0 & 0 \\ 0 & 1 & 0 \end{bmatrix} \end{matrix}$$

∴ The graph is



②

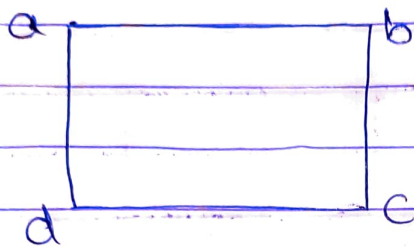
$$\begin{bmatrix} 0 & 1 & 0 & 1 \\ 1 & 0 & 1 & 0 \\ 0 & 1 & 0 & 1 \\ 1 & 0 & 1 & 0 \end{bmatrix}$$

Let

$$B = \begin{matrix} & \begin{matrix} a & b & c & d \end{matrix} \\ \begin{matrix} a \\ b \\ c \\ d \end{matrix} & \begin{bmatrix} 0 & 1 & 0 & 1 \\ 1 & 0 & 1 & 0 \\ 0 & 1 & 0 & 1 \\ 1 & 0 & 1 & 0 \end{bmatrix} \end{matrix}$$

The given matrix is symmetric. It is undirected graph.

The graph is



③

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

let

$$C = \begin{matrix} & \begin{matrix} a & b & c & d & e \end{matrix} \\ \begin{matrix} a \\ b \\ c \\ d \\ e \end{matrix} & \begin{bmatrix}
 0 & 1 & 0 & 1 & 0 \\
 1 & 0 & 1 & 0 & 1 \\
 0 & 1 & 0 & 1 & 1 \\
 1 & 0 & 1 & 0 & 0 \\
 0 & 1 & 1 & 0 & 0
 \end{bmatrix} \end{matrix}$$

The given matrix is a symmetric -

\therefore It is an undirected graph

\therefore The graph is

