130
120
100
90
10

= 25 + 1.56 = 26.56 (Ans)

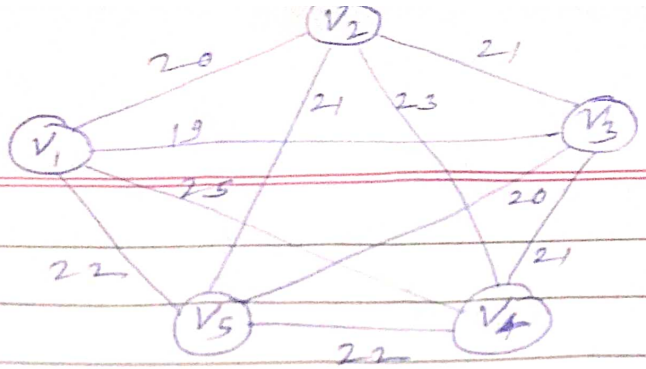
TSP

(Another variations of TSP to solve using Branch and Bound Method)

Rules:- 1. First create a cost matrix for the graph.

2. Find the smallest weight in source vertex (S), corresponding to the same go in that row find its minimum weight edge. Again repeat the same procedure until it returns to its destination without visiting any node twice.

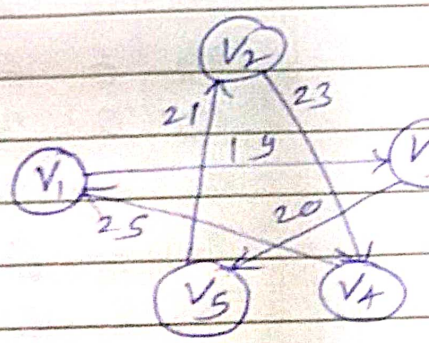
Q-1



	V_1	V_2	V_3	V_4	V_5
V_1	0	20	19	25	22
V_2	20	0	21	23	21
V_3	19	21	0	21	20
V_4	25	23	21	0	22
V_5	22	21	20	22	0

Assume V_1 is source vertex, visits all other vertexes and back to source vertex with minimum cost is a TSP problem

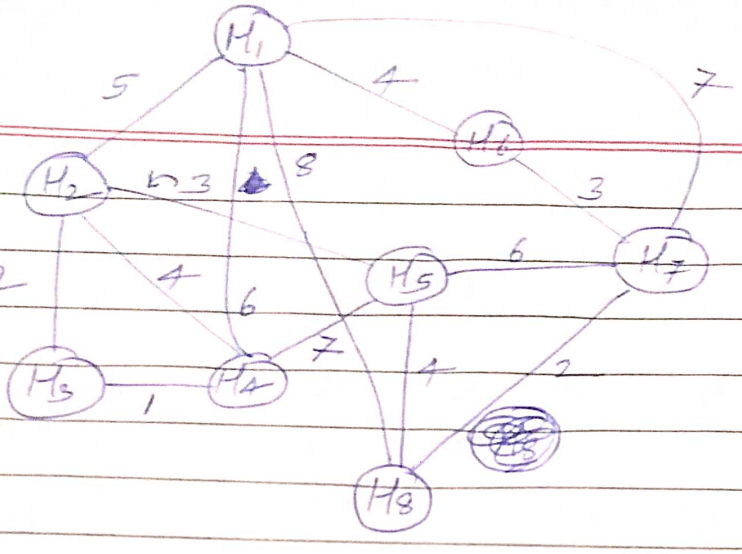
	V_1	V_2	V_3	V_4	V_5
V_1	0	20	(19)	25	22
V_2	20	0	21	(23)	21
V_3	19	21	0	21	(20)
V_4	25	23	21	0	22
V_5	22	(21)	20	22	0



TSP Path $V_1 \xrightarrow{19} V_3 \xrightarrow{20} V_5 \xrightarrow{21} V_2 \xrightarrow{23} V_4 \xrightarrow{25} V_1$

Total Path cost = 19 + 20 + 21 + 23 + 25 = 108

Q-2 A newspaper agent to the assigned ar has to cover all houses in the resp tive area with minimum travel cos (distance/time). Apply the solution & fin the minimum cost.



So,

	H_1	H_2	H_3	H_4	H_5	H_6	H_7	H_8
H_1	0	5	0	6	0	4	7	8
H_2	5	0	2	4	3	0	0	0
H_3	0	2	0	1	0	0	0	0
H_4	6	4	1	0	7	0	0	0
H_5	0	3	0	7	0	0	6	4
H_6	4	0	0	0	0	0	3	0
H_7	7	0	0	0	6	3	0	2
H_8	8	0	0	0	4	0	2	0

Assume source is H_1

So

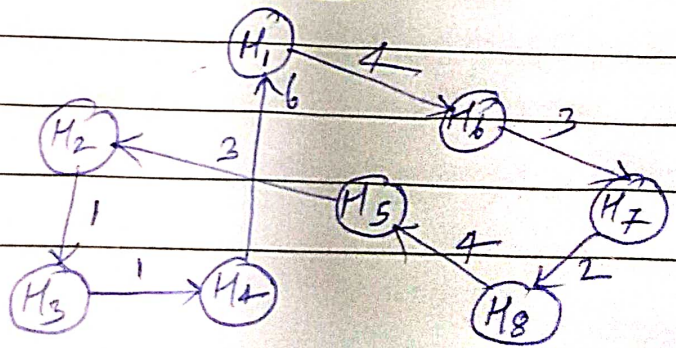
	H_1	H_2	H_3	H_4	H_5	H_6	H_7	H_8
H_1	0	5	0	6	0	(4)	7	8
H_2	5	0	(2)	4	3	0	0	0
H_3	0	2	0	1	0	0	0	0
H_4	6	4	1	0	7	0	0	0
H_5	0	(3)	0	7	0	0	6	4
H_6	4	0	0	0	0	0	3	0
H_7	7	0	0	0	6	3	0	(2)
H_8	8	0	0	0	(4)	0	2	0

$H_1 \xrightarrow{4} H_6 \xrightarrow{3} H_7$

$\xrightarrow{2} H_8 \xrightarrow{4} H_5$

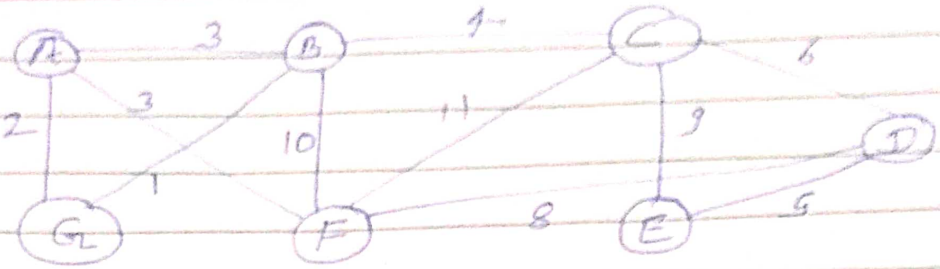
$\xrightarrow{3} H_2 \xrightarrow{2} H_3$

$\xrightarrow{6} H_4 \xrightarrow{6} H_1$



TSP cost
$= 4+3+2+4+3+2+1+6$
$= 25$

Q-3 Consider the graph to finding the shortest path of minimum cost spanning tree (MST) for Prim's, & Kruskal's and TSP problems.

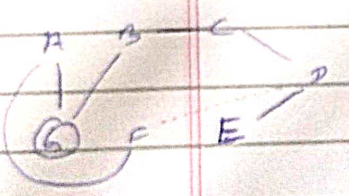


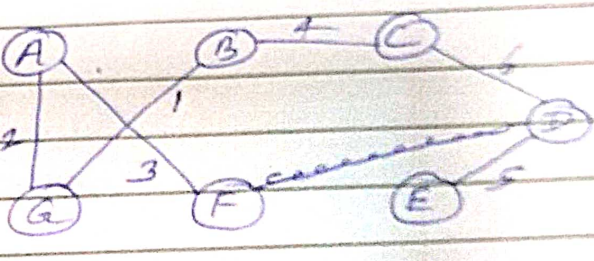
Sol^{n} :-

(i) Kruskal's method

1. Create a table for cost in ascending order.
2. Consider each cost edges one by one so that it doesn't form a cycle.

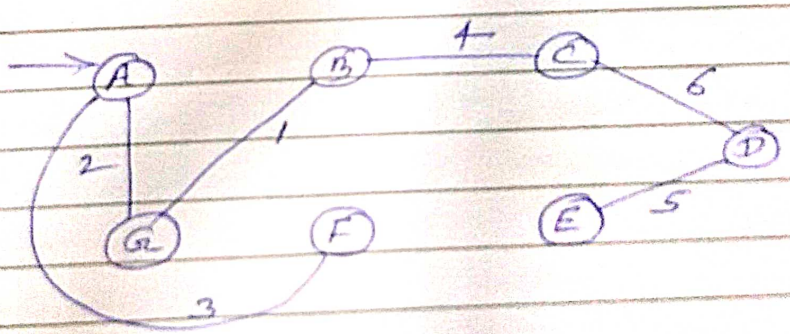
Edge Name	Cost of Edge
BG	1 ✓
AG	2 ✓
AB	3 (No)
AF	3 ✓
BC	4
DE	5
CD	6
FD	8 (No)
CE	9 (No)
BF	10 (No)
CF	11 (No)





TSP Cost
= 1+2+3+4+5+6
= 21

(ii) Prim's



Total cost
= 21

(iii)

	A	B	C	D	E	F	G
A	0	3	0	0	0	3	2
B	3	0	4	0	0	10	1
C	0	4	0	6	9	11	0
D	0	0	6	0	5	8	0
E	0	0	9	5	0	0	0
F	3	10	11	8	0	0	0
G	2	1	0	0	0	0	0

A → G → B → C → D → E
→ No path for F
TSP optimal cost not possible