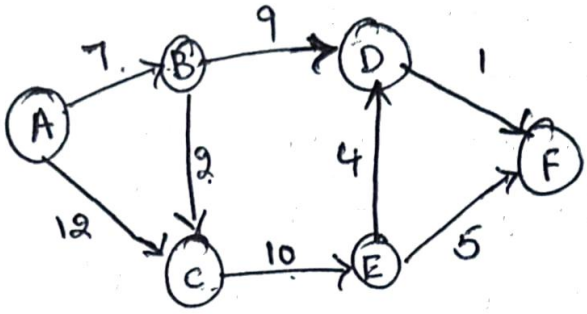
Example 2:- Find shortest path for the following graph using Dijkstra's Algorithm.



Sol:- → Remove loops and parallel edges from the given graph if any.

→ Re Construct the graph again and start Processing.

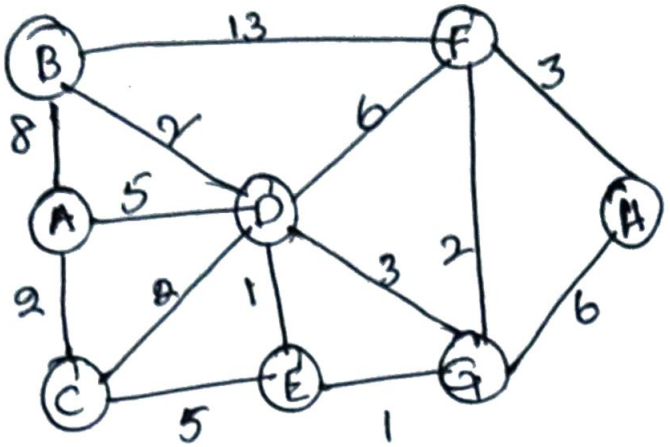
(i)

	A	B	C	D	E	F
start vertex → A	[0]	∞	∞	∞	∞	∞
B	—	[7]	12	∞	∞	∞
C	—	—	[9]	16	∞	∞
D	—	—	—	[16]	19	∞
→ F Ending vertex	—	—	—	—	19	[17]
	—	—	—	—	19	←

F → D → B → A ⇒ A → B → D → F

Path ⇒ 7 + 9 + 1 ⇒ 17

Example 3:- Find shortest path for the following graph using Dijkstra's Algorithm.



Sol:- → Remove loop's and Parallel edges from the given graph

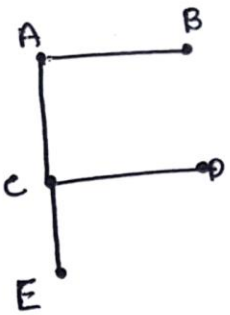
→ ReConstruct the graph again and start the process.

	A	B	C	D	E	F	G	H
Starting vertex A	[0]	∞	∞	∞	∞	∞	∞	∞
C	—	8	[2]	5	∞	∞	∞	∞
D	—	8	—	[4]	7	∞	∞	∞
E	—	[6]	—	—	[5]	10	7	∞
B	—	[6]	—	—	—	10	6	∞
G	—	—	—	—	—	10	[6]	∞
F	—	—	—	—	—	[8]	—	12
H	—	—	—	—	—	—	—	[11]

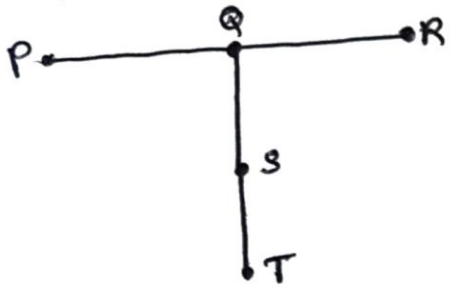
Path:- H → F → G → E → D → C → A

⇒ A → C → D → E → G → F → H ⇒ 2+2+1+1+2+3 ⇒ 11 ✓

Example: Check whether the following graphs are Isomorphic or not ?



Graph $G_1(V_1, E_1)$



Graph $G_2(V_2, E_2)$

Sol:- Conditions for 2 graphs to be Isomorphic is

(1) Both graphs must Contain same number of vertices

(2) Both graphs must Contain same number of edges

(3) " " " " same degree sequence

(4) One-to-one Correspondence between the vertices of 2 graphs must be same.

(5) Edge Preserving should be satisfied
(Each edge in Graph-I is equivalent to an edge in Graph-2)

(6) Adjacency matrix of both graphs must be same.

Now lets verify above all the Properties

Graph $G_1(V_1, E_1)$

① No. of vertices = 5

② No. of edges = 4

③ Degree sequence [A, B, C, D, E] = (2, 1, 3, 1, 1)

④ One-to-one mapping

C (3) ← A(2), D(1), E(1)

A (2) ← B(1), C(3)

A ⟺ S
B ⟺ T
C ⟺ Q
D ⟺ R
E ⟺ P

⑤ Edge Preserving Property

A − B ⟺ S − T
A − C ⟺ S − Q
C − D ⟺ Q − R
C − E ⟺ Q − P

⑥ Adjacency matrix of G_1

	A	B	C	D	E
A	0	1	1	0	0
B	1	0	0	0	0
C	1	0	0	1	1
D	0	0	1	0	1
E	0	0	1	0	0

Graph $G_2(V_2, E_2)$ ②

① No. of vertices = 5

② No. of edges = 4

③ Degree sequence [P, Q, R, S, T] = (1, 3, 1, 2, 1)

④ One-to-one mapping

Q (3) ← P(1), R(1), S(2)

S (2) ← T(1), Q(3)

⑤ Edge Preserving Property

P − Q ⟺ E − C
Q − R ⟺ C − D
Q − S ⟺ C − A
S − T ⟺ A − B

⑥ Adjacency matrix of G_2

	S	T	Q	R	P
S	0	1	1	0	0
T	1	0	0	0	0
Q	1	0	0	1	1
R	0	0	1	0	1
P	0	0	1	0	0

∴ all '6' criterias are satisfied ∴, the graphs G_1 & G_2 are Isomorphic graphs. ∎