0|10|19 V_6 (1) V_5 V_4

Theorem

The distance btw the spanning trees of a graph is a metric

(i) $d(T_i, T_j) \geq 0$ → Non-negativity

$d(T_i, T_j) = 0$ if $T_i = T_j$

(ii) Symmetry

$d(T_i, T_j) = d(T_j, T_i)$

(iii) Triangular Inequality

$d(T_i, T_j) \leq d(T_i, T_k) + d(T_k, T_j)$

Forest → Collectn of trees

Spanning Forest ↓ Collectn of spanning trees

Maximum Distance btw 2 Spanning Trees

$d(T_i, T_j) = \frac{1}{2} N(T_i \oplus T_j)$

$\max d(T_i, T_j) = \frac{1}{2} \max N(T_i \oplus T_j)$

$\leq n-1$, No. of branches

$\leq r$, rank → (1)

$\max d(T_i, T_j) \leq \mu$, No. of chords (Nullity) → (2)

$\leq e-n+1$

$$\boxed{\max d(T_i, T_j) = \min(r, \mu)}$$

Central Tree

A tree T_0 is called a central tree of G if

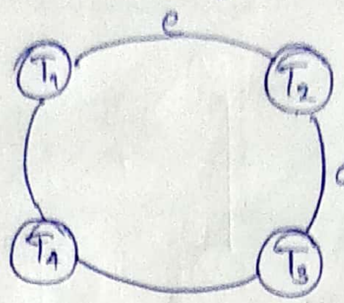
$\max d(T_0, T_i) \leq \max d(T, T_j) \ \forall$ T of G

Scanned by CamScanner

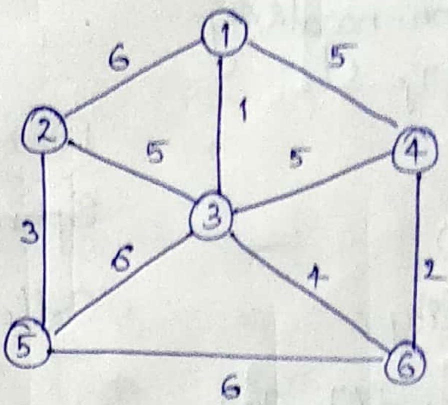
Tree Graph

It is a graph in which each vertex corresponds to a spanning tree of G & each edge corresponds to a cyclic interchange btw the spanning trees of G.

G
↓
T_1 T_2 T_3 T_4 ...

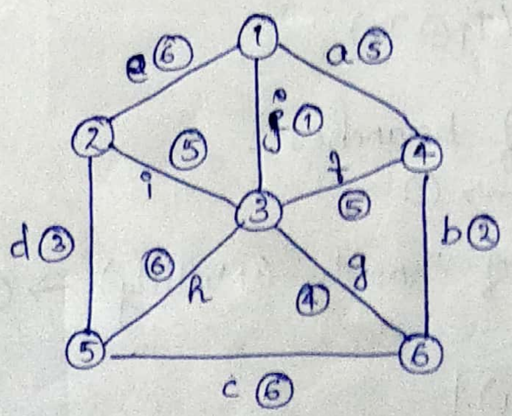


①



min.
Find spanning trees using both Kruskal's & Prim's algorithms.

ans Kruskal's

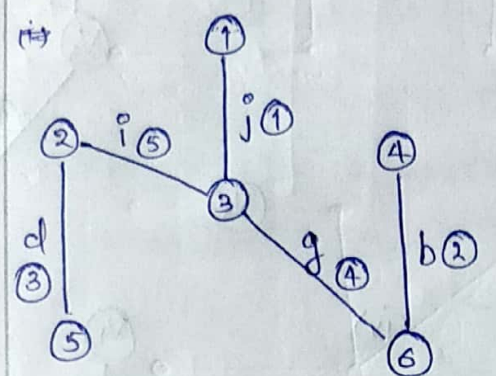


Edge	Weight
j	1
b	2
d	3
g	4
a	5
f	5
i	5
c	6
e	6
h	6

Step 1:- e = {j, b, d, g, a, f, i, c, e, h}

Step 2:- Smallest edge = j

Step 3:-



Step 4:- $n-1 = 6-1 = 5$ Min. weight = 15

Prim's

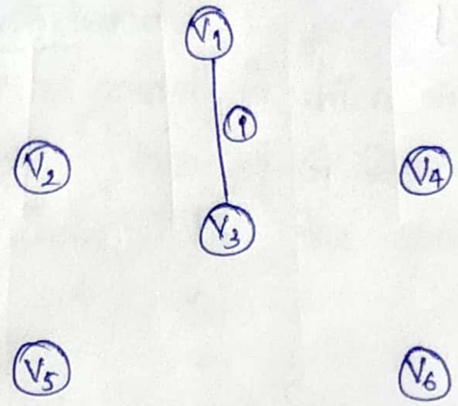
Step 1:-

Step 2:-

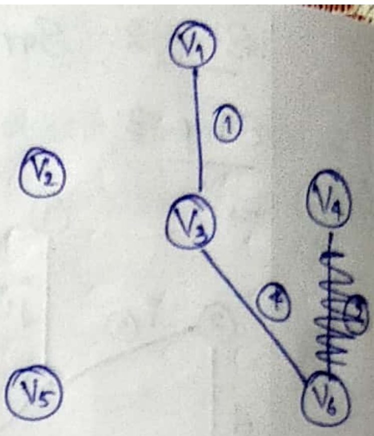
$$
\begin{array}{c|cccccc}
 & V_1 & V_2 & V_3 & V_4 & V_5 & V_6 \\
\hline
V_1 & - & 6 & 1 & 5 & \infty & \infty \\
V_2 & 6 & - & 5 & \infty & 3 & \infty \\
V_3 & 1 & 5 & - & 5 & 6 & 4 \\
V_4 & 5 & \infty & 5 & - & \infty & 2 \\
V_5 & \infty & 3 & 6 & \infty & - & 6 \\
V_6 & \infty & \infty & 4 & 2 & 6 & -
\end{array}
$$

Step 3:- Starting from V_1, connecting it to it's nearest neighbour.

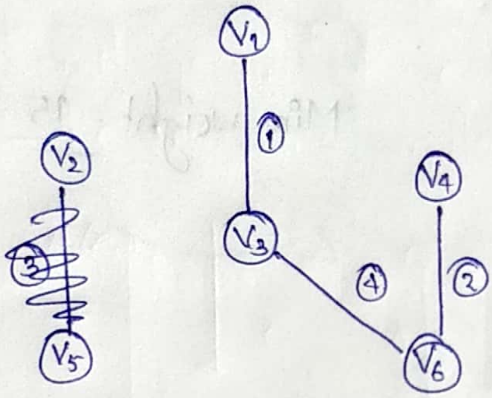
(i)



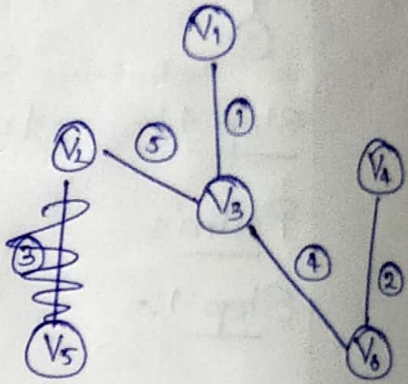
(ii)



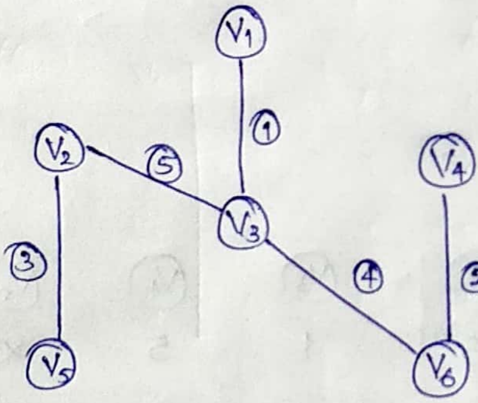
(iii)



(iv)



(v)



Min. weight = 15