1. PERT

PERT stands for programme evaluation and review technique.

1. Three time estimates are made.
2. It is based on probabilistic approach.
3. Time is directly proportional to time hence minimum cost will be achieved corresponding to minimum completion time.
4. Suitable for new type of projects.
5. Each activity follows β distribution.

(i) Expected completion time of an Activity : (t_E)

$$t_E = \frac{t_0 + 4t_m + t_p}{6}$$

Where, t_0 = Optimistic time
t_p = Pessimistic time
t_m = Most likely time

(ii) Standard deviation of an Activity (σ) $\sigma = \frac{t_p - t_0}{6}$

(iii) Variance of an activity : (σ^2) $\sigma^2 = \left(\frac{t_p - t_0}{6}\right)^2$

(iv) Central limit theorem :

(a) The mean time of the project as a whole is $t_E = t_{E_1} + t_{E_2} + \ldots\ldots$ along the critical path.

Probability of completion of project in time t_E is 50%.

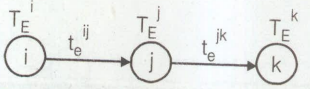
(b) The standard deviation of the project as a whole is $\sigma = \sqrt{\sigma_1^2 + \sigma_2^2 + \sigma_3^2 + \ldots\ldots}$ along the critical path.

- **Critical Path:** The time wise longest path is called critical path. In this path any type of delay in any event will cause delay to the project. These are shown by double line or dark lines in a network.
  An event is critical if its slack is zero.

EVENT TIME

(i) Earliest expected event occurring time (T_E)

$T_E^j = T_E^i + t_e^{ij}$ when there is only one path.



Where, t_e^{ij} = Expected completion time of an activity i – j

$T_E^j = (T_E^i + t_e^{ij})_{max}$ .... when there are more than one path.

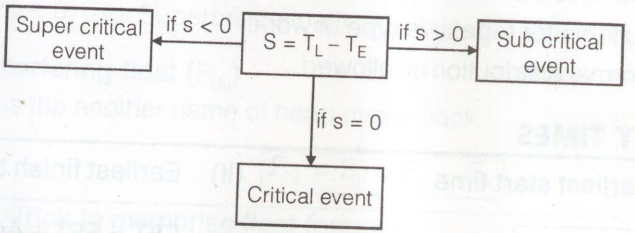
Where T_E^i = Earliest expected time of event i.
T_E^j = Earliest expected time of event j.

(ii) Latest allowable occurrence time (T_L):

$T_L^i = T_L^j - t_e^{ij}$ when there is only one path.

$T_L^i = (T_L^j - t_e^{ij})_{min}$ when there are more than one path.

(iii) Slack (s): This is the time by which an event may be delayed without affecting the completion time of the project.



If there are more than 1 critical paths then variance and SD of the project along each critical path may be different. Under such circumstances that path requires more attention along which SD or variance is greater. Hence the variance or SD of the project should be taken the largest value among all the paths.

- **Probability Factor (z)**

$$z = \frac{T_s - T_E}{\sigma}$$

Where, T_S = Given scheduled completion time of the project
T_E = Expected completion time of the project.
σ = Standard deviation

z	P
0	50%
+1	84.13%
+2	97.72%
+3	99.87%

z	P
0	50%
–1	15.87%
–2	2.28%
–3	0.13%