Safety margins:- refers to additional time or resources allocated to tasks or projects to account for uncertainties, potential delays or unforeseen challenges.

(8)

* Goldratt's Critical Chain Method (CCM):-

- It is a project mgmt approach developed by Goldratts as an extension of the Theory of Constraints (TOC).
- It's main aim is to improve project delivery by focusing on resource constraints & reducing project durat^{n} through better scheduling & buffer management.

* Key Concepts of Critical Chain Method:-

i) Critical chain vs Critical path:.

- CPM focuses on task dependencies, CCM considers both task dependencies & resource availability.
- it identifies the longest sequence of dependent tasks that considers both precedence relationship & resource constraints.

ii) Buffer Management:-

Buffers are nothing but time reserves that are incorporated into the project schedule to absorb uncertainties & ensure timely project completion. so, instead of adding safety time to individual tasks, CCM aggregates safety margins into project buffers to absorb uncertainties efficiently.

Types of Buffers:-

- Project Buffer:- Placed at the end of the critical chain to absorb delays.
- Feeding Buffers:- Placed before non-critical tasks merge into the critical chain.
- Resource Buffers:- used to ensure that key resources are available when

(4)

iii) Eliminating Multitasking:-
- it doesn't use multitasking because switching between tasks leads to inefficiencies & delays
- instead it performs one task at a time to improve throughput.

iv) Relay Race Approach:-
- instead of waiting for scheduled start time for task, it starts to work as soon as resources are available. which is similar to a relay race where the baton is passed as quickly as possible

v) Focus on Flow Instead of Cost:-
- CPM focuses on cost minimization while CCM prioritizes faster project completion & reducing uncertainty.

* Benefits of Critical Chain Method:-
i) faster project completion by reducing unnecessary safety margins
ii) Better resource utilization by removing multi-tasking.
iii) increased reliability through effective buffer management.
iv) Focus on Project Flow.