Unit V : Software Quality Assurance and security
(weightage -14marks).

① Explain four Basic principles of software project scheduling. (4M)

→

① Compartmentalization

The project must be compartmentalize into number of manageable activities and tasks. To accomplish compartmentalization both product and process are Decomposed.

② Interdependency

The interdependency of each compartmentali activity or task must be determined. Some task must occur in sequence while other can occur in parallel.

Some activity cannot commence until work product produced by another is avitable. other activities can occur independent.

③ Time allocation

Each task to be scheduled must be allocated Some number Of work unit (eg- person-days of effort).

The start date and end date of each allocated task must be Specific

④ **Effort validation**

Every project has defined number of staff members. The number of people allocated for scheduled task must be specified validated by project manager.

⑤ **Defined responsibilities**

Every task that is scheduled should be assigned to specific team member.

⑥ **Defined outcomes**

Every task that is scheduled should have a defined outcome. For software projects such as works product or part of a work product.

Work producted are often combined in deliverable.

⑦ **Defined milestones**

Every task or group of task should be associated with a project milestone.

Milestone is a software tool for planning that's used to mark a point in prod project schedule.

② Describe work breakdown with Structure diagram. (4m)

⟹ Work breadown &structure (WBS) is a process of dividing the complex projects to simpler and manageable tasks.

In WBS, large tasks are broken down into manageable task (chunks) of work.

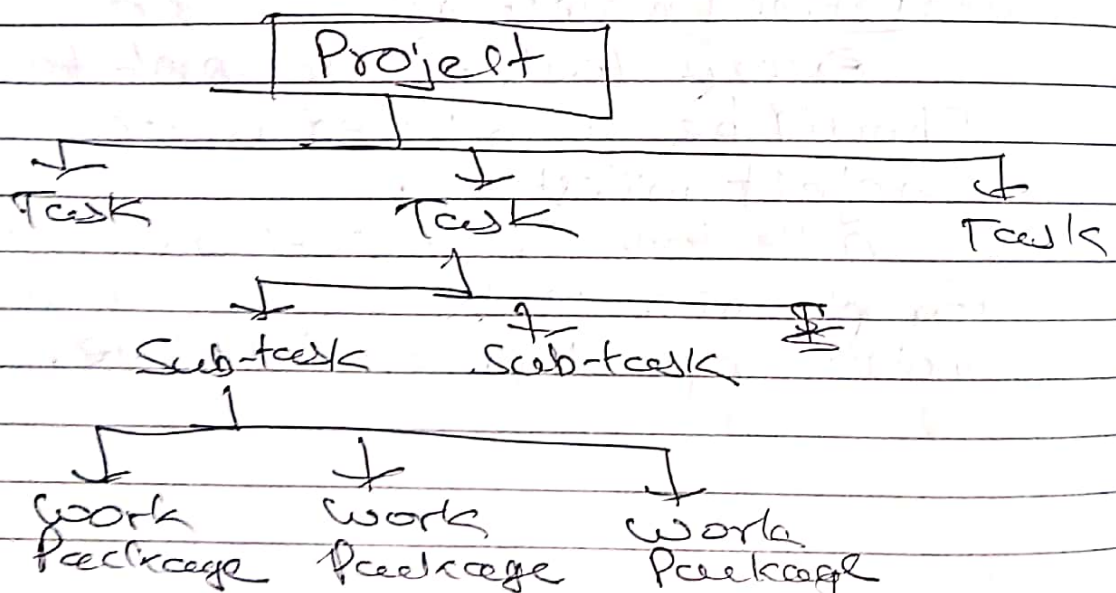These chunks can be easily manag or examined and analysised.

The project manager is & responsible for creation of WBS.

Steps
Step 1: Identify major activites of project.
Step 2: Identify sub-activities.
Step 3. Repeat till undividable, simple and independent activites are created.

Project managers and subject matter experts (SME) kick off the work breakdown structure by pinpointing the main deliveries.

From there, SMEs start dissecting high-level task into smaller chunks of work.

Task breakdown in WBS depend on project type and management style.

Common practices involve "two weeks" rules, which advises against tasks smaller than two weeks worth of work, and the 8/80 rule, which sets a minimum of 8hrs and maximum of 80 hours per task.

WBS can be displayed in tree structures, lists, or tables with which is straightforward method.

③ Define software quality control.

⇒ Software Quality Control is a set of activities for ensuring the quality of software products.

It is procedure that focuses on fulfilling the quality requested.

It to aims to identify and fix defects - It is method to verify the Quality - Validation.

It also involves executing a program and hence it's a correct technique.

④ Define Software quality assurance

⇒ SQA means and practice of monitoring all software engineering processes, method and work product to ensure compliance against defined standards.

It consist of auditing and reporting functions of management.

The goal of Quality assurance is to provide management with the data necessary to be informed about product quality, thereby gaining insight and confidence that product quality is meeting its goals.

It's a Preventive technique.

⑤ Name four software quality assurance activities.

→ i) Prepares an SQA plan for project.

ii) Participates in development of project's software process description.

iii) Reviews software engineering activities to verify compliance with defined software process.

iv) Audits designed software work products to verify compliance with those defined as part of software process.

v) Records any non compliance and reports to senior management.

⑥

Quality Assurance	Quality Control
It is a procedure that focuses on providing assurance that quality requested with be achieved.	It is procedure that focuses on fulfilling the quality requested.
QA aims to prevent to prevent defect	QC aims to identify and fix defects
It is preventive technique	It is corrective technique
It is proactive measure	It is reactive measure
It does not involve executing the program.	It involve executing of program.
It is performed before Quality Control	It is performed after QA activity is done
low level activity	high level activity.
Less time consuming	More time consuming

6marks (fix)

⑦ Describe cmmI. Give significance of each level. (6marks).

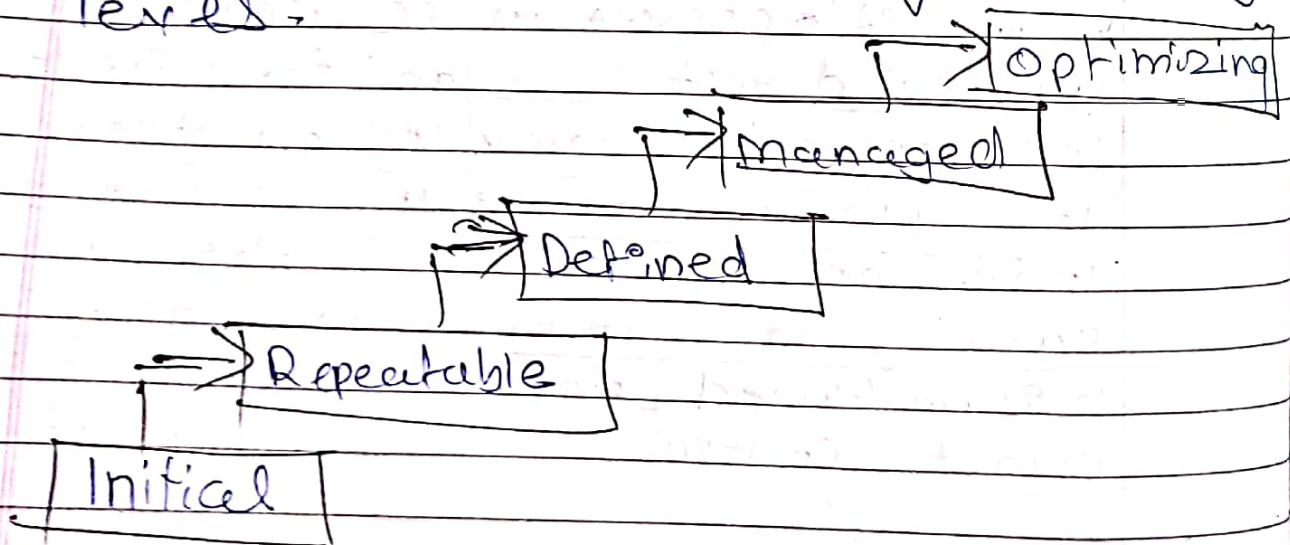⟹ The Capability Maturity Model Integration (CMMI)

It is a comprehensive process meta-data model that is predicated on a set of System and software engineering capability that should be present as organizations reach different levels of process or capability and maturity.

The CMMI represents a process meta-model in two different ways.

i) Continuous model & ii) Stage model.

The Continuous CMMI meta-models describes a process in two dimensions.

- Each process area (eg project planning or requirement management) is formally assessed against specific goals and practices and is rated according to following capability levels.

Optimizing

Managed

Defined

Repeatable

Initial

Level 1: Initial

The software process is characterized as ad hoc and occasionally even chaotic. Few process are defined and success depends on individual effort.

Level 2: Repeatable

Basic project management processes are established to track cost, schedule and functionality. The necessary process discipline is in place to repeat earlier successes on projects with similar applications.

Level 3: Defined

The process is standardized, documented and followed.

All the projects used documented and approved version of software process which is useful in developing and supporting system.

Level 4: Managed

Detailed measures of software process and product quality are collected.

Both the software process and product are quantitatively understood and controlled using detailed measures.

This level includes all characteristics defined for level 3

Level 5 : Optimising

establish mechanisms to plan and
implement change, Innovative Ideas
and technologies can be tested.
This level includes all characteristics
ties defined for level 4.

8) **Six Sigma Strategies and state the**
phases of DMAIC and DMADV.

→ **Six Sigma**

Six sigma is method for improving
the quality of output by identifying
and eliminating the causes of defects,
reducing variation in process.

Goal of Six Sigma

The goal of is to achieve a level
where 99.99966% of products are
defect free.

Characterties of Six Sigma

① **Statistical Quality Control.**
Use statistics, like deviation, to
measure quality.
② **Methodical Approach.**
Follow a structed approach like
DMAIC (Define - Measure - Analyze - Improve -
Control). or DMADV (Define - Measure -
Analyze - Design - Verify).

③ Data-Based

Relies on facts and data for decesion making.

④ ~~Produc~~ Project and objective Based

Tailored to specific project needs.

⑤ Customer Focus

Quality standards are based on customer requirements.

⑥ Teamwork

Requires organizational collabration for quality management.

DMAIC Phases

↳ Define — Define the problem or project goal.

↳ Measure — Measure and understand customer needs.

↳ Analyze — Analyze the process for improvements.

↳ Improve — Implements to meet customer needs.

↳ Control - maintain the improvements.

DMADV Phases

Define : Define project objective

measure : measure customer needs

Analyze : Analyze options to meet customer needs.

Design : Design a process to meet requirements

Verify : verify design ability to meet customer needs.