Pre-Workshop Reference Material

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Instructions

On the next page, you will find a small quiz – 'quick check'!
'Quick Check' triggers your interest to read through the reference material.

A cursory reading would help you solving the 'quick check'!
So, please solve the "quick check"!

You shall find the answers for all the points in the subsequent pages.

☺ Happy Reading ☺

Quick Check!

1. _____, _____, and _____ are known as the triple constraints of the project management.
2. The factors; which have no control of project managers on their presence or absence but, do influence the project positively or negatively are known as _____ _____ _____
3. The standard operating process, checklists, and past project records can be found in _____ _____ _____.
4. A table that links the requirements to their origin and traces them throughout the project life cycle is known as _____ _____ _____
5. The WBS stands for _____ _____ _____
6. The WBS is prepared by the project manager alone – True or False? : _____
7. The key output of project initiating process is _____ _____ and it provides the _____ to project manager to use organizational resources in project.
8. The result of the team development is _____ _____
9. The release criteria (criteria to be followed while releasing the team member from the project team) are generally explained in staffing management plan – True or False? _____
10. Status Reports are more detailed report than Progress Report – True or False? _____
11. If one needs to understand who needs, what information, by when, in what format, to what details; then the document that is referred to is _____ _____ _____
12. If there are 15 stakeholders on the project, then the maximum number of communication channel available is _____
13. "80 percent of the problems come from 20 percent of the causes." This statement is based on _____'s rule of 80/20
14. Seven consecutive results on the side of the mean indicate an assignable cause and is known as the _____ ___ _____.
15. Rework, scrap, and product recall, are the examples of Cost of Non-Conformance. True of false? _____
16. The organization applies small changes to products and processes to improve consistency, reduce costs, and provide overall quality improvements. This is known as _____ .
17. The organization strives for constant improvement for products and business practices. This is known as _____ .
18. The three processes described in project quality management are _____ , _____, and _____
19. "_____" estimates, also known as "_____" estimates are completed by the performing organization (buyer) to determine if sellers completely understand the requirements of the project work.

20. Bids and quotes are needed when the decision is made mainly on _____. Whereas _____ are needed when decisions are based on other factors, such as experience, qualifications, and approaches to the project work.
21. _____, _____, and _____ are the three main types of the contract.
22. _____ risks are risks that remain after avoidance, transference, mitigation, and acceptance. _____risks are new risks that arise from a risk response.
23. The output of risk management planning is the_____ _____ _____.
24. The formula for CPI determination is ____/____ and the formula for SPI is ____/____.
25. _____ estimating starts with lowest level and each component of the WBS is accounted for to roll up to the grand total of the project.
26. _____ estimating uses a similar past project to estimate the cost of the current project.
27. The_____ path is the longest path to completion in the network diagram.
28. _____ float is the amount of time an activity can be delayed without affecting the next activity's scheduled start date. _____ float is the amount of time an activity can be delayed without affecting the project end date.
29. Mandatory dependencies are also known as _____ logic while discretionary dependencies are also known as _____ logic.
30. The process groups in project management as described in PMBOK are _____, _____, _____, _____, and _____.
31. Project life cycle is the collection of project _____.
32. _____, _____, and _____ _____ are the three characteristics of any project.

Overview of Project Management

Exploring Project Attributes

- Projects are temporary, and create unique product or service or end results..
- Projects move from concept to completion through progressive elaboration.
- Uniqueness, Temporary and Progressive elaboration are the three characteristics of any project.
- All projects have their own life cycle, while the project management life cycle has five distinct phases: Initiation, Planning, Execution, Control and Closure.
- Not all projects get selected. The decisions to choose one project over another may vary from organization to organization. The process, however, is always called Project Portfolio Management.

Project Management Framework

- Within the project management framework, there are ten knowledge areas, which span the project management life cycle.
- Project Integration Management: focus is on managing all of the moving parts of a project.
- Project Scope Management: focus is on protecting, fulfilling and delivering the project scope.
- Project Time Management: focus is on scheduling activities, monitoring the project schedule, and working with the project team and stakeholders to ensure the project completes on time.
- Project Cost Management: focus is on estimating and maintaining project costs.
- Project Quality Management: focus is on setting the quality expectations and then delivering the project product with the expected level of quality.
- Project Human Resources Management: focus in on developing the project team to work together to deliver the project as expected.
- Project Communications Management: focus is on delivering needed information to the correct parties, at the correct time.
- Project Risk Management: focus is on identifying, mitigating, and managing project risks.
- Project Procurement Management: focus is on soliciting, selecting, and managing vendors to complete project work or supply project materials.
- Project Stakeholder Management: focus is on identifying, analyzing stakeholders, their expectations, to foster appropriate stakeholder engagement.

Identifying Project Manager Characteristics

- A project manager must have multiple skills to be successful, including the ability to communicate, manage a budget, be organized, negotiate, and provide leadership for the project.
- Project managers in different sectors of business and non-profit entities encounter situations unique only to their area of expertise. For example, a project manager of a construction project will have different issues and concerns than a project manager of a manufacturing project.
- Project managers require organization.

Project Management and Organizations

- The Project Management Framework is the inner construction of project management that allows it to operate and fluctuate from organization to organization.
- Projects within each organization will follow the culture and expected practices of the organization hosting the project. Projects, in any organization, operate to support the organization and its purpose.

Project Phase Create Projects

- Projects follow a logical sequence of phases to completion. Phases are typically different from project to project since the project work will differ from one to the next. The point of segmenting projects into phases is to allow for smaller, manageable sections, and to provide deliverables in support of the ongoing operations.
- The collection of the project phases, as a whole, is known as the project life cycle.
- Project life cycles define the beginning, middle, and end of a project. Projects have a greater risk and uncertainty in the early phases of the project life cycle than near its end. The project is also most susceptible to change, failure, and stakeholder influences at the beginning of the life cycle than near its end. In tandem, project costs and demand for resources are generally low at the beginning of the project, have a tendency to peak near the end of the project work, and then diminish.

Organizational Structures

- Organizational structures have direct influence over the project. Organizations structures determine the procedures that the project manager must follow and the amount of authority the project manager possesses. A project office may oversee project management activities and provide additional support in any of the organizational structures. The organizational types and the level of authority a project manager can expect the shown in the following table :

Organizational Structure	Level of Authority of a PM
Functional	Low to none
Weak matrix	Low
Balanced matrix	Low to moderate
Strong matrix	Moderate to high
Projectized	High to complete
Composite	Varies

- Beyond the concept of getting the work done, project managers must also consider the social, economic, and environmental influences that may sway a project. Specifically, the project manger must evaluate the project to see its social, economic, and environmental impact – as well as note the project's surroundings. The project manager may have some external guidance in these areas in the form of standards and regulations.
- Standards are guidelines that are generally followed but not enforced or mandated. Regulations come in the form of laws and industry demands, which are enforced by various governing bodies.

Enterprise Environmental Factors

- No project can be performed completely isolated from the environment. In fact, then the isolated environment itself stands as an environment for the project. This environment can be internal to the organization, internal to the project or external to the project and/or organization. There are many factors in the environments like availability of skilled personnel for the project, market conditions, organization structure, culture, infrastructure available for the project, etc. These factors are known as 'enterprise environmental factors'.
- The key characteristic of all such factors are that they are in no control of a project manager or a project management team. However, these factors have some impact on the projects. A project manager cannot control the existence or absence of factors but can definitely control their influences. Positive influences of such factors are enhanced while negative influences are reduced.

Organizational Process Assets

- Every organization undergoes learning process – knowingly or unknowingly. The experiences of many people prove to be useful in the development and growth of the organization. The experiences take the form of either procedures or history, when documented. The procedural documentation may include best practices, templates, formats, checklists, thumb rules, 'do's and 'don'ts'. The history may include past project data, records, reports, successful negotiations, skills

inventory, cost and time data, risk databases, issue databases, contracts, and other records.

- These items form very useful assets. They are known as Organizational Process Assets. A project manager is immensely helped by reliable organizational process assets.
- It is necessary to update existing organizational process assets throughout the project life cycle. The project management team is responsible for this activity.

Project Management Processes

- Projects are comprised of processes. People, not things, complete processes; processes move the project or phase to completion.
- There are two broad categories of processes across all project types: project management processes and product-orientated processes. Project management processes are universal to all projects as they control the project management life cycle. Product-orientated processes are unique to the product the project is creating.
- The five process groups, initiating, planning, executing, controlling, and closing comprise projects and project phases. These fie process groups have sets of actions that move the project forward towards completion.
- Within the five process groups there are two categories of processes: core and facilitating. Core processes are logical in order and follow a somewhat stringent progression. Facilitating processes are more flexible and support the core processes.

Project Management Framework

- The three components of processes, inputs, tools and techniques, and outputs, spurn decisions, conditions, plans, and reactions to conditions and progress. The output of the process serves as the input to another. Within each process, the tools and techniques, such as expert judgment, guide and influence the output of a process. A faulty output will likely influence downstream processes negatively.
- Project processes can be customized to meet the needs and demands of the project. Some processes may be moved to better meet the conditions and from a project. Use caution: a process that is not completed does not necessarily mean it was not needed.
- The ten knowledge areas :
  1. Project integration management
  2. Project scope management
  3. Project time management
  4. Project cost management
  5. Project quality management
  6. Project human resource management

7. Project communications management
8. Project risk management
9. Project procurement management
10. Project Stakeholder Management

Project Scope Management

Project Scopes

- Projects move through products orientated processes to create the project's product. These processes are typically marked by phases unique to the project work. For example, foundation, framing, roofing, finishing, and so on. Project management processes are the activities universal to all projects.
- There are two scopes: the project scope and the product scope. The project scope is the work to be completed to create the product. The product scope describes the features of the product and its characteristics.
- Collecting requirements is a very important process of defining and documenting the stakeholders' needs to meet the project objectives. The requirements become the foundation for WBS and scope statement which in turn are the fundamental documents for planning rest of the areas in the project like cost, human resource, scheduling, procurements, etc. It is important to have the requirements documented in a form which will help establishing and maintaining the traceability of the requirements to business needs, objectives, functionality, development, tests, performance, legal aspects, etc. Such a document in a table form is known as RTM – requirements traceability matrix.
- Scope management is the process that follows the scope management plan. It ensures that the scope includes all of the required work – and only the required work – to complete the project. It documents how changes may enter into the scope, and how frequently the scope is expected to change.
- At the end of the project phase – or even at major deliverables within the project – scope validation happens. Scope validation is the process of formally accepting the project work as defined in the product documentation, the project scope, or in the contractual agreement, if relevant. Formal acceptance requires signoff for acceptance of the product.

Project Time Management

Defining & Sequencing Activities

- Project is made up of sequential activities to create a product. The WBS and the activity list serve as key input to the sequencing of project activities. The science of arranging, calculating, and predicting how long the activities will take to complete allows the project manager to create a schedule and then predict when the project will end.
- Hard logic is the approach that requires activities to happen in a specific order due to the nature of the work. For example, configure a computer workstation's operating systems before adding the software.
- Soft logic is a "preferred" method of arranging activities based on conditions, guidelines, or best practices. For example, the project manager prefers all of the photocopying of a user manual to be complete before any bindery work on the manual begins.
- The sequence of activities is displayed in a network diagram. The network diagram illustrates the flow of activities and the relationship between activities. The Precedent Diagramming Method is the most common approach to arranging activities visually.

Estimating Activity Durations

- Activity duration estimates are needed to calculate how long the project will take to complete, Estimates can come from project team members, commercial databases expert judgment, and historical information.
- Analogous estimating relies on historical information to predict how long current project activities should last.
- Quantitative estimates use a mathematical model to calculate how long activities should take based on units, duration, and effort.

Estimating resources for activities

- The resources to complete the project activities must be considered. The project manager must evaluate the skill set, the experience, and ability to get the work done.
- The project manager must evaluate applying additional resources to effort driven activities to reduce their duration. Adding resources does not reduce fixed-duration activities durations.
- The calendar of the project is the time when the project work may take place. The project manager must consider access to the workplace, project schedule, organization holidays, and events that affect the project calendar.
- The resource calendar reflects when the project resources (project team members, consultants, and so on) are available to complete the project work.

Determining the Project Duration

- The critical path is the longest path to completion in the network diagram. Activities on the critical path have no float or slack. Free float is the amount of time an activity can be delayed without affecting the next activity's scheduled start date. Total float is the amount of time an activity can be delayed without affecting the project end date.
- Duration compression is applied to reduce the length of the project or to account for project delays. Crashing adds resources to project activities and usually increases cost. Fast tracking allows activities to happen in tandem and usually increases risk.
- The schedule management plan must be consulted when project schedule changes occur, are proposed, or are needed. The Schedule Control System implements the schedule management plan and is part of integration change management.

Project Cost Management

Resources and the Project Work

- The project manager must know what resources are needed to complete the project work. How ill be project ever be completed without the resources? The Project manager must know the people, the equipment, materials, and other resources needed to make the vision of the project a reality.
- The resources also must be known so the project manager may predict, monitor, and control what the project costs are expected to be. The relation between the project vision and the needed resources can help the project manager work within the predicted costs.
- Resources to complete a project also include services, leases, real estate, and other components that contribute to the project work being complete.

Creating Project Estimates

- The identified resource requirements and the WBS are two key tools to identify what resources are needed for what component of the project. The cost of the resources help the project manager calculate the estimated costs based on the duration of the project activities or the amount of materials applied to the project.
- Analogous estimating uses a similar project to predict what the cost of the current project should be. It is less accurate, but easier and faster to complete than methods.

- Bottom-up estimating starts with lowest level, and each component of the WBS is accounted for to reach a grand total of the project. It is the most accurate method, but it takes longer to complete.
- Parametric estimating uses a parameter for units of goods and time to calculate what the project will cost. For example, cost per hour, cost per metric ton, or cost per cubic yard.

Monitoring & Controlling Project Costs

- The cost management plan documents how the project manager will react to cost variances within the project. The performing organization will likely have policies and procedures on unacceptable variances.
- Variances that cross a given threshold may require the project manager to create a variance report to explain the variance, why it has happened, and what corrective action has been applied to prevent the variance from recurring.
- Cost control is the process of monitoring and documenting cost changes, whether they are allowed to occur or prevented from occurring. The project manager studies the cost changes to understand why the change has happened and then makes corrective actions to the project if needed.

Project managers should know how to estimate, budget, and manage costs. The WBS is an input to estimating costs, as it reflects the whole of the project. When creating the estimates, rely on documented historical information over team member's recollections. There are three estimating approaches:

- Analogous – A top-down approach that is less costly and less accurate than others and provides just an idea of what the project will cost.
- Bottom-up – Starts with zero and adds up all the expenses. This is more costly and takes longer, but gains team buy-in to the project.
- Parametric modeling – Uses a parameter for labor and goods to calculate the cost of the project.

The accuracy of the estimates is based on available information. As the project manager and the project team progressively elaborate the project plan, more details become available. The more details a project has, the more accurate the estimate. Know these facts on estimating:

- Rough order of magnitude – The accuracy of the estimate is – 25 percent to + 75 percent and is used in the initiation process and in top-down estimating.
- Budget estimate – The accuracy of the estimate is – 10 percent to + 25 percent. This is used early in the planning process and also in top-down estimating.
- Definitive estimate – The accuracy of the estimate is – 5 percent to + 10 percent. This is used late in the planning process and in bottom-up estimating.

The resources on a project can include people, materials, and equipment. If the people on a project do not have the necessary skill set to complete the work, either hire an SME to guide the project implementation, outsource the project work, or train the current people for the needed skills.

Applying Earned Value Management

Earned value management is a tool to measure project performance. Earned value is the budget at completion multiplied by the percentage of the project work that has been completed. The Cost Performance Index shows how well the project is performing financially. It is calculated by dividing EV by the actual costs spent on the project. Earned value management is a method to measure project performance.
The formulae covered in this chapter are

- BAC = **B**udget **A**t **C**ompletion
- PV = **P**lanned **V**alue = What the project should be worth at this point in the schedule
- AC = **A**ctual **C**osts of the project work to date.
- EV = **E**arned **V**alue
- CPI = EV/AC and SPI = EV/PV
- EAC = **E**stimate (Forecast) **A**t **C**ompletion
  BAC/CPI **or** EAC = AC + {(BAC-EV)/TCPI}
- ETC = **E**stimate (Forecast) **T**o **C**omplete = Remaining Cost
  EAC-AC

Project Risk Management

Planning for Risk Management

- Risk management planning is determining how the risk management activities within the project will take place. It is not the response or identification of risk, but the determination of how to manage project risks.
- Risk management planning is accomplished through planning meeting with the project team, management, customers, and other key stakeholders.
- Utility function is a person's willingness to accept risks.
- The output of risk management planning is the risk management plan.

Managing Risk

- Risks are uncertain events that can affect a project's objectives for good or bad.
- Risks can be placed into four different categories: Technical, quality or performance risks; project management risks; and external risks.

- Project files from published information and previous projects can serve as input to risk identification.
- The Delphi Technique allows participants to identify risk anonymously without fear of embarrassment. A survey allows results to be shared with all participants for comments on each other's anonymous input. Rounds of surveying and analysis can create consensus on the major project risks.
- Triggers are warning signs that a risk is about to happen or has happened.

Analyzing Identified Risks

- Risks are evaluated for their impact and likelihood.
- Risks can be ranked by ordinal ranking by using such indicators as very low, low, moderate, high, and very high.
- Risks can also be analyzed using a cardinal ranking system of numerical values that are assigned to each risk based on its impact and probability.
- An overall project risk ranking can be used to compare the current projects with other projects in the organization.
- The risks can be moved into quantitative analysis of for further study.
- Risks are assigned numeric values. Such as there is a 50 percent likelihood that the risk will occur, causing a $10,000 cost.

Risk Management Methods

- The Monte Carlo simulation can determine that likelihood of the project's success, predict the costs of a specific risk exposure, and identify realistic time, scope, and cost objectives. Interviews with stakeholders and subject matter experts are an excellent start for quantitative risk analysis.
- Decision-trees help determine the cost, benefit, and value of multiple decisions. They are based on the cost of the decision and the probability of completing an objective.

Responding to Identified Risks

- Risk response planning focuses on reducing threats and increasing opportunities as a result of risks. Risk thresholds, defined in risk management planning, describe the acceptable level of risk within a company.
- Risk owners are the individuals or groups that are responsible for a risk response, and should participate in the risk response planning.
- Risk avoidance changes the project plan to avoid the risk, as well as conditions that promote the risk, or it attempts to reduce the risk's impact on the project's success.
- Risk transference moves the risk consequence to a third party. The risk doesn't go away, just the responsibility of the risk. Though ultimately, the performing organization still retains the ultimate accountability and results of the risk event.

- Risk mitigation involves actions designed to reduce the likelihood of a risk occurring, or reduce the impact of a risk on the project objectives, or both.
- Risk acceptance acknowledges the risk exists and responses actively or passively.
- Residual risks represent amount of risks that remain after avoidance, transference, mitigation, and acceptance. Secondary risks are new risks that arise from a risk response.

Completing Iterative Risk Management

- Identified risks must be tracked, monitored for warning signs, and documented. The responses to the risks are monitored and documented as successful, or less successful than expected.
- Issue logs, action item lists, jeopardy warnings, and escalation notices are all types of communication reports the project them and risk owners must use to document and track identified risks.
- Risk response audits measure the success of the responses and the effectiveness of the cost, scope, and quality values gained or lost by the risk responses.
- Techniques like earned value analysis not only measures project performance, but it can also predict and signal pending risks within the project. .As unexpected risks arise, the project team may elect to use workarounds to diminish the impact and probability of those risks. Workarounds, however, should be documented and incorporated into the project plan and risk response plan as they occur.

Project Procurement Management

Plan Procurement Management

- Plan Purchases & Acquisition is process that determines which aspects of the project can best be fulfilled by procuring the specified products or services.
- The Project scope serves as a key input, as this describes the work, and only the required work, needed to complete the project.
- A clearly defined products description is needed in order to successfully procure the product.
- Make-or-buy analysis calculates and predicts which is better for the performing organization to make the product or to hire an entity outside of the organization to make the products.
- Fixed Price (or lump-sum), Cost reimbursable, and Time & Material are the three main types of the contract. Type of contract selected mainly depends upon clarity and details of SOW.

- Some contracts can transfer the risk to the seller; other contract types require the buyer to retain the risk of cost overruns.
- The Procurement Management Plan describes the procedures for procuring work or products.
- Bids and quotes are needed when the decision is made on price. Proposals are needed when decisions are based on other factors, such as experience, qualifications, and approaches to the project work.
- The buyer should provide the seller with a SOW, details on the type of response needed – such as a proposal, quote, or bid, and any information on contractual provisions, such as non-disclosure agreements or a copy of the model contract the buyer intends to use.

Conduct Procurements

- Conduct Procurement is a process of requesting the potential sellers to provide bids, proposals, or quotes to complete the project work or supply the described product, obtaining the seller responses, evaluating the sellers, and awarding the contract.
- An organization may retain a qualified seller list from which the project team is forced to select a vendor. In other instances, the project team can rely on trade associations, industry directories, and other resources to locate qualified sellers.
- Advertisements for the procured process in newspaper and trade publications can increase the list of sellers the buyer can choose from. Many government entities must publish procurement opportunities.
- Bidder conferences allow sellers to meet with the buyer to query the buyer on details of the procurement process. The goal of the bidder conference is to ensure that all prospective sellers have the same formation and all of the needed information to complete an accurate bid or proposal.
- Samples of the sellers' previous, related produces or services can serve as evaluation criteria.
- Contract negotiation focuses on finding fair and reasonable price for both the buyer and the seller.
- Weighting systems are unbiased approaches to determine which seller has the best offer to complete the procured product or service.
- Screening Systems allow an organization to screen out sellers that do not qualify for the procured product or service.
- "Should cost" estimates, also known as "Independent Estimates" are completed by the performing organization (buyer) to determine if sellers completely understand the requirements of the project work.

Control Procurements

- Procurements administration ensures the sellers and buyers both are meeting their contractual obligations.
- Change requests may require updates to the contract between the buyer and the seller. Contract Change requests are part of the Integrated Change Control system.
- The project manager must document and report to the seller and management on how the seller is meeting its contract obligations.

Close Procurements

- It is a process of formally completing and closing each project procurement
- Contract documentation—such as the contract, schedules, relevant documentations, approved contract changes, performance reports, and other pertinent information—is needed to complete contract closeout.
- Procurement audits are intended to review, document, and share the successes and failures of the current project's procurement process. The information can be applied to other projects within the organization.
- A contract file is created and is included with in project records as part of the historical information of the current project.

Project Quality Management

Ensuring Project Quality

- The project manager is responsible for the overall quality management of the project and must set quality expectations based on the requirements of the customers and stakeholders.
- The project manager must integrate the quality control of the project with the quality assurance program of the performing organization.
- Quality is planned into a project, not inspected in.

Enforcing Project Quality

- The Project team members (the people actually completing the project work) have the power and responsibility of the quality of the deliverables.
- The project team, as guided by the project manager and the quality management plan, should be empowered to stop the project work when preset, quality thresholds are exceeded.
- Quality planning is an iterative process. As quality concerns creep into the corrective actions – are taken to ensure quality.

Implementing Quality Control

- Quality control monitors specific results within a project.
- Quality control is concerned that the results must satisfy relevant quality standards.
- Quality control can rely on root cause analysis used to eliminate unsatisfactory results.
- Quality control is completed through inspection.

Implementing Quality Assurance

- Quality assurance monitors overall results for process capability analysis.
- Quality assurance may use a QA program to set quality standards.
- Quality assurance represents the implementation of the quality plan.

Relying on Quality Management

- Quality management is the process to ensure the project is completed with no deviations from the requirements. There are several quality management philosophies :
- Total Quality management (TQM) – The organization strives for constant improvement for products and business practices.
- Kaizen – The organization applies small changes to products and processes to improve consistency, reduce costs, and provide overall quality improvements.
- Marginal analysis – The cost of the quality is not greater than the increased sales because of the level of quality implemented. Ideally, the revenue generated because of the quality improvements far exceeds the cost of the quality.

Evaluating Quality Costs

- The cost of quality is the amount of monies the performing organization must spend to satisfy the quality standards. This can include training, safety measures, additional activities implemented to prevent nonconformance.
- The cost of nonconformance to quality is the monies or events attributed to not satisfying the quality demands. These can include loss of business, downtime, wasted materials, rework, and cost and schedule variances.
- Optimal quality is reached when the cost of quality meets or exceeds the incremental cost to achieve quality.

Charting Quality Control

- Fishbone diagram – This is a cause and effect diagram that illustrates the factors which may be contributing to quality issues or problems. It is also known as an Ishikawa diagram.
- Flow charts – Flow charts demonstrate how a system works from start to finish, and illustrate how system components are integrated.

- Pareto diagrams – These histograms are related to Pareto's 80/20 rule, "80 percent of the problems come from 20 percent of the issue." The diagram charts the problems, categories, and frequency. The project team should first solve the larger problems and the move onto smaller issues.
- Control Charts – These charts plot out the results of inspections against a mean to examine performance against expected results. Upper and lower control limits re typically set to + three or six sigma. Results that are beyond the control limit value are considered out of control. Out of control results have an assignable cause that requires investigation to determine why the result occurred. In addition, seven consecutive results on the side of the mean indicate an assignable cause and is known as the "Rule of Seven".

Project Communication Management

Planning for Communication

- Communication centers on who needs what and on when and how you are going to give to give it to them.
- Communication requirements are defined by stakeholders.
- Communication planning is accomplished early in the planning processes.
- Communications are linked to the organizational structure of the performing organization.
- Constraints and assumptions can affect the communications planning.
- If there are 10 stakeholders in the project then 'maximum' number of communication channels available is 45. This uses the formula [N(N-1)]/2.

Communications Management Plan

- Provides instructions on how to gather and disseminate project information.
- Provides instructions for the planning, structuring and monitoring of effective and efficient communication
- Provides instructions on the communications methods, such as interactive meetings, hard copies of reports, e-mail and use of intranet sites, knowledge repositories, etc.
- This, to some extent, depends on choice of right communication technology. The plan may provide instructions about the same.
- Includes a schedule of expected communications, such as reports and meetings.
- Provides a method to access needed information between regularly schedule communications.

Managing Communication

- Ensures that the various reports / memos distributed to project stakeholders are appropriately generated as per instructions from communication plan.
- Ensures that right information is distributed to the right person at the right time.
- Addresses needs of stakeholders for additional information, clarifications or discussions.
- Provides information at an appropriate level for each audience (communication requirement analysis). Also needs to ensure that the distributed information is received, acknowledged and understood at an appropriate level.
- Sometimes issues or concerns on the project may trigger a need for adjustment, action or intervention to information needs of stakeholders.
- Project stakeholders may also change their power and interest levels. This may also lead to change in communication requirements.
- In general, through meetings and using an expert judgment one can figure out the communication effectiveness and may trigger a necessary change. Thus, managing and controlling communication is on-going and iterative.

Project HR Management

Planning for Project Human Resource Management

- Project human resource management focuses on utilizing the people involved in the project in the most effective way. The people involved in the project are more than just the project team members, though they're the most obvious.
- The project manager can't forger to involve other stakeholders: customers, management, individual contributors, the project sponsor, and any other stakeholder unique to the project.
- Human Resource planning call on the project manager to identify the roles and responsibilities of the project and the reporting relationship within the organization.
- Reporting relationship can be internal, such as to management, or external, such as to a customer or community. The relationship and the procedure to communicate with these project interfaces must be documented.

Documenting Human Resources Management

- Because projects are often similar, the project manager can rely on templates to re-create the success of historical projects. Reporting structures, role and responsibility matrixes, and other human resource models can be replicated, and adjusted, between projects.

- The staffing management plan describes the process that the project manager must follow to bring resources onto a project, or to dismiss them from a project when the resources are no longer needed.
- The policies and procedures of the performing organization should be documented within the staffing management plan to ensure the guidelines are followed as management intends.
- The staffing management plan will also details the policies of how the project manager can recruit and release project team members. The plan may also detail the procedure to procure resources for the project from vendors or consultants.

Involving the Project Stakeholders

- Throughout the project, the project manager must work with the project team to develop their ability to complete their project work, grow as a team, and focus on completing the project work accurately and on time.
- A reward the recognition system can help the project manager motivate the project team to perform as hoped.
- Special care to involve the project team must be given when the team is scattered geographically. The project manager can rely on face-to-face meetings, videoconferences, or teleconferences to promote non-collocated teams.

Developing the Project Team

- Ideally, the project is collocated and has access to a war room to refer to project information, research, schedules, and other project team members.
- The goal of team development is outstanding performance for the good of the project. Through training, the project team may increase their ability to work together and individually with a higher level of confidence, performance, and teamwork.
- The result of team development is project performance improvements. The improvements should be noted in an honest appraisal of the project team members' effort and contributions to the project.

Project Stakeholder Management

Identifying Project Stakeholders

- Project stakeholders are individuals, businesses, or communities that have a vested interest in the project's outcome. Typically, project stakeholders are

involved in the project process and their expectations drive the project requirements.

- It is essential to scan for hidden stakeholders early in the project life cycle to eliminate the need for change when addressing stakeholder needs later in the project.
- It is essential to analyze the impact or support of each stakeholder. This helps to prioritize stakeholders to efficiently slice the project manager's available time to effectively communicate and manage the key stakeholders
- There are several key stakeholders that have direct influence over the project. They are
  - Project Manager – Manages the project
  - Customer – Pays for the project; uses the project deliverable
  - Performing organization – The organization hosting the project
  - Project team – The collection of individuals completing the project work
  - Project Sponsor – Authorizes the project work and budget
  - Vendors / suppliers – Deliver the part of product / service of the project

Managing Project Stakeholders

- Stakeholder management goes beyond just managing the project team.
- It is about building strong bridges between project team and various stakeholders to increase their support, reduce resistance
- Therefore, accurately spotting the key stakeholders and identifying appropriate strategies to effectively engage with them, lays the foundation for project's success. This is the planning part of stakeholder engagement.
- Proactively addressing potential concerns in a timely manner helps a great deal. At the same time clarifying and resolving issues bothering stakeholders is also critical.
- Project manager's interpersonal and management skills are critical for successfully engaging variety of stakeholders on a given project
- As the project evolves, the planned stakeholder engagement strategies may or may not work effectively. The stakeholders themselves may undergo changes as the project's environment changes.
- Therefore, periodically reviewing the list of identified stakeholders, their information (power, interest level, etc), and the effectiveness of planned activities to build the required bridges between stakeholder communities becomes critical.

Project Integration Management

Project Integration Management

- Project integration management relies on project plan development, project plan execution, and Integrated Change Control. Integrated Change Control manages all the moving parts of a project.
- Project integration management is a fancy way of saying that the project components need to work together – and the project manager sees to it that they do. Project integration management requires negotiation between competing objectives.
- Project integration management calls for general management skills, effective communications, organization, familiarity with the product, and more. It is the day-to-day operations of the project execution.

Determining the Need for Project

- Projects are created to provide a solution for a problem or to take advantage of an opportunity. Projects can be created to reduce costs, reduce waste, increase revenue, increase productivity and efficiency, or produce other results. The project manager should know why the project is created in order to aim towards the project purpose.
- Some projects require a feasibility study to prove that the problem exists or to conduct root cause analysis to find the root of a given problem. Feasibility studies also determine the possibility of the project to solve the identified problem for a reasonable cost and within a reasonable amount of time.
- The product description describes the expected outcome of the project. The product description should define what the project is creating. If the project is solving a problem, the product description should describe how the organization will perform without the problem in existence. If the project is seizing a market opportunity, it should describe the organization with opportunity seized. Basically, product descriptions describe life after a successful project.

Selecting Projects

- Projects are selected based on many different conditions: opportunity, need, customer demands, and so on. The project purpose and business need must be identified so the project scope can be created to support this purpose.
- When there are multiple projects up for approval, management may use one of two methods to choose between them: benefit measurement methods (which are comparative models), or, for large complex projects, constrained optimization methods (which focus on complex mathematical equations).

Authorizing Projects

- Once a project is selected, it moves through the initiation processes. One of the major outputs of initiation is the project charter; it's major because it provides authority for the project. Specifically, the project charter provides authority, names the project title and the project manager. The charter defines the business needs the project product will satisfy.
- The charter should be written in open terms and dialogue so it does not have to be re written because it is too narrow. The charter should be written and signed by senior management in order to gain access to the necessary project resources.
- A project does not exist until a charter has been created.

Planning the Project

- You should know that planning is an iterative process and that the results of planning are inputs to the project plan. The project plan is a fluid document, authorized by management, and guides all future decisions on the project.
- The project plan is a fluid work in progress. Updates to the plan reflect changes to the project, discoveries made during the project plan execution, and conditions of the project. The project plan serves as a point of reference for all future project decisions, and it becomes future historical information to guide other project managers. When changes occur, the cost, schedule, and scope baselines in the project plan must be updated.
- The WBS (Work Breakdown Structure) is one of the most important pieces in the project plan. It serves as an input to schedule development, roles and responsibility assignments, risk management, and other processes.
- The WBS is a decomposition of the project work into manageable portions. A heuristic of the WBS is that work packages should not be less than 8 hours nor more than 80 hours. The WBS is not created by the project manager alone, but with the project team.

Project Constraints

- Projects have at least one or more constraints: time, cost, and scope. This is known as the triple constraint of project management. Constraints are factors that can hinder project performance.
- Time constraints include project deadlines, availability of key personnel, and target milestone dates. Remember that all projects are temporary: the have a beginning and an end.
- Cost constraints are typically predetermined budgets for project completion. It's usually easier to get more time than more money.

- Scope constraints are requirements for the project deliverables regardless of the cost or time to implement the requirements (safety regulations or industry mandates are examples).

Performance Reporting

- Status reporting provides current information on the project.
- Progress reporting provides information on what the team has accomplished – and may include information on what is yet to be accomplished.
- Forecasting provides information on how the remainder of the project or phase is expected to go.
- Variance analysis examines the reason why cost, schedule, scope, quality, and other factors may vary from what was planned.
- Trend analysis is the study of trends over time to reveal patterns and expectations of future results.
- Earned value analysis is a series of formulas that reveal and predict project performance.
- Change requests may stem from performance reports.

Managing Change Control

- Integrated Change Control is the process of documenting and controlling the features of a product, measuring and reacting to project conditions, and revisiting planning when needed.
- Project needs a Change Control System to determine how changes will be considered, reviewed, and approved or declined. A Change Control System is a documented approach to how a stakeholder may request a change and then what factors are considered when approving or declining the requested change.
- Configuration Management is part of change control. It is the process of controlling how the characteristics of the product or service the project is creating are allowed to change.

Administrative Closure

- Administrative closure is the formal documentation, organization, and archival aspects of a project or phase acceptance.
- Administrative closure should also happen when the project is terminated,
- The project archives include the complete index of all project records, documents, products specifications, and any relevant documents. The project archives will serve as historical information for future projects.
- The project team and the project manager complete the Lessons learned documents throughout the project phases.

Human Motivation Theories

Motivation is the force that initiates, guides and maintains goal-oriented behaviors. There are a number of theories to explain motivation. Each individual theory tends to be rather limited in scope.

Maslow's Hierarchy of Needs Theory

- Human beings have wants and desires which influence their behavior. Only unsatisfied needs influence behaviors.
- Needs are arranged in order of importance to human life, from basic to the complex, as follows:
    - Physiological needs (hunger, thirst, shelter, etc)
    - Safety, security, health
    - Belongingness, love, friendship
    - Self-esteem, recognition, achievement
    - Self actualization or realization
- A person advances to the next level of needs only when the lower level need is at least minimally satisfied
- E.g. if you haven't slept or eaten adequately you won't be interested in self esteem desires.
- The further the progress up the hierarchy, the more individuality, humanness and psychological health the person will show

Herzberg's Two Factor Theory

- Concludes that intrinsic factors are related to job satisfaction, while extrinsic factors created job dissatisfaction.
- When people felt happy and satisfied at work conditions present were directly affecting their inner feelings and self esteem.
- Yet dissatisfaction was created by the environment the people worked in and interactions within that environment.
- As job satisfaction and dissatisfaction are controlled by different factors Herzberg concluded that job satisfaction was not opposite of job dissatisfaction.
- He distinguished between:
    - Motivators – e.g. challenging work, recognition, responsibility and
    - Hygiene factors – e.g. status, salary, job security, etc. These don't motivate if present. However, if absent, can cause demotivation.
- The name "hygiene factor" is used because like hygiene, the presence will not make you healthier but the absence would cause health deterioration.

- This theory concentrates on importance of internal job factors as motivating forces. And it recommends to –
  - Form self managing and self organizing teams
  - Providing continuous, regular feedback on productivity and job performance directly to employees
  - Encouraging employees to take part in planning, performing and evaluating their work

David McClelland's Three Need Theory

- Concludes that human motivation is dominated by three needs. It categorizes the needs as follows:
  - The need for achievement – need to achieve, excel and succeed
  - The need for power – the need to lead others and make an impact
  - The need for affiliation – need for friendly relationships and human interactions
- The importance of each of these needs will vary from person to person
- Understanding that need may help to decide how to influence that individual
- A person's motivation and effectiveness can be increased through an environment which provides an ideal mix of each of these three needs for an individual.

McGregor's X-Y Theory

- Theory X & Y represent two sets of assumptions about human nature and behavior that are relevant to practice of management
- Theory X assumes that generally individuals dislike work and require close supervision to do their job.
- Theory Y assumes that generally individuals are industrious, able to assume responsibility and exercise self control in their jobs.
- Under theory X manager's leadership styles are likely to be autocratic
- Theory Y on the other hand fosters leadership styles that are participative, empower subordinates. Manager is more likely to act as a coach

Expectancy Theory

- This theory has become a commonly accepted theory for explaining how individuals make decisions regarding various behavioral alternatives
- It offers following propositions:
  - When deciding among behavioral options, individuals select an option with the greatest motivation forces (MF)
  - The motivational force is a function of three distinct perceptions
  - MF = Expectancy x Instrumentality x Valence

- Expectancy probability – based on perceived effort – performance relationship. Is based on past experience, self confidence and perceived difficulty of the goal.
    - E.g. If I work harder than others, will I actually deliver more output?
- Instrumentality probability – based on perceived performance – reward relationship. It is a belief that if one performs better he or she will receive greater rewards.
    - E.g. If I deliver more than others, will I get a bigger raise or quicker promotion?
- Valence – refers to the value an individual places on the reward. This is a function of his or her needs, goals and values.
    - E.g. Do I want a bigger raise? Is it worth extra effort?

Because motivation force (MF) is a product of three perceptions, if any one has value of 0, whole equation yields 0!

Types of Power in Management

There are five types of power in management. They are:

Reward Power

- Employee believes that they are going to get some type of reward for doing their job and it would be coming from the supervisor.
- Reward could be pay, days off, etc.

Coercive Power

- Supervisor intimidating an employee to do the work (threats and punishments)
- They can be fired or demoted
- This can be compared to someone having a power trip complex

Legitimate Power

- Power that one gets due to the position he or she is in the organization
- E.g. a manager has the legitimate power to appraise performance of a team member and rate him accordingly
- Or CBI has a legitimate power to conduct independent inquiry ☺

Referent Power

- Leaders with charismatic personality can use their charm and charisma to get the best out of their employees
- If a manager can build a strong relationship with employees it helps him / her to bring the best out of them

Expert Power

- This is the ability to influence others using your skills, knowledge and expertise is referred to as expert power
- This kind of power depends more on your personal skills
- Is based on one individual believing that another individual has so much expertise in an area that they believe everything that is being told to them

Answers on next page … ☺

Answers:

1. Scope, time, and cost
2. Enterprise Environmental factors
3. Organizational Process Assets
4. Requirements Traceability Matrix
5. Work Breakdown Structure
6. False
7. Project Charter, Authority
8. Performance improvement
9. True
10. False
11. Communication management plan
12. 105
13. Pareto
14. "Rule of Seven"
15. True
16. Kaizen
17. TQM
18. Quality Planning, Quality Assurance, and Quality Control
19. Should cost, Independent
20. Price, Proposals
21. Fixed Price (or lump-sum), Cost reimbursable, and Time & Material
22. Residual, Secondary
23. Risk management plan
24. EV/AC, EV/PV
25. Bottom-up
26. Analogous
27. Critical
28. Free, Total
29. Hard, Soft
30. Initiating, Planning, Executing, Controlling, and Closing
31. Phases
32. Uniqueness, Temporary and Progressive elaboration