PMP Bootcamp: Mastering Project Cost & Resource Budgets – Planning, Estimating & Controlling Finances

Student Name: _____ Date: _____

Instructions: Effectively managing project costs and the resources that drive them is critical for project success and delivering value. This worksheet explores how to plan for costs, estimate them accurately, determine the overall budget, and then control costs and resources throughout the project.

Core Concept Reminder (from PMBOK 7 & Rita):

- **PMBOK 7th Edition:** The "Planning" and "Delivery" performance domains are central. Ensuring the project delivers **value** within financial constraints is key. "Tailoring" cost management approaches based on project context is important.
- **Rita Mulcahy's PMP Exam Prep (11th Ed.):** Stresses that cost management is about more than just tracking expenses; it's about forecasting, managing variances, and making informed decisions. Earned Value Management (EVM) is a key tool.

Part 1: Understanding Cost Management – The Basics

1. **Key Definitions Related to Budget and Resource Management:**
    - **Cost:** A resource sacrificed or foregone to achieve a specific objective, or something given up in exchange.
    - **Budget (Project Budget):** The approved estimate for the project or any work breakdown structure component or any schedule activity.
    - **Cost Baseline:** The approved version of the time-phased project budget, excluding any management reserves, which can be changed only through formal change control procedures. It is used as a basis for comparison to actual results.
    - **Contingency Reserve:** Budget within the cost baseline allocated for identified risks ("known unknowns") that are accepted and for which contingent responses are developed.
    - **Management Reserve:** An amount of the project budget withheld for management control purposes for unforeseen work that is within scope of the project ("unknown unknowns"). It is NOT part of the cost baseline.
    - **Question:** What is the key difference between a Contingency Reserve and a Management Reserve in terms of what they cover and who controls them?

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2. **Cost Management Overview (Traditional/Predictive Processes):**

1. **Plan Cost Management:** (How will we manage costs?)
2. **Estimate Costs:** (How much will individual activities/work packages cost?)
3. **Determine Budget:** (Aggregate costs to establish a cost baseline)
4. **Control Costs:** (Monitor spending and manage changes to the cost baseline)

3. **Desired Outcomes from Successful Budget and Resource Management:**
    - Realistic and approved project budget.
    - Project completed within the approved budget.
    - Effective use of resources (value for money).
    - Early identification and management of cost variances.
    - Informed decision-making regarding project finances.

Part 2: Planning & Estimating Project Costs

1. **Plan Cost Management:**
    - **Purpose:** The process that establishes the policies, procedures, and documentation for planning, managing, expending, and controlling project costs.
    - **Key Output: Cost Management Plan.** What information would this plan typically contain? (List two examples)
      i. _____
      ii. _____
      (Examples: Units of measure, levels of precision/accuracy, control thresholds, rules for performance measurement (EVM), reporting formats)
2. **Estimate Costs:**
    - **Purpose:** The process of developing an approximation of the monetary resources needed to complete project work.
    - **Inputs:** Cost Management Plan, Scope Baseline (WBS!), Schedule, Resource Requirements, Risk Register, EEFs/OPAs.

- **Estimating Techniques (Many are similar to duration estimating):** Expert Judgment, Analogous, Parametric, Bottom-Up, Three-Point Estimating, Data Analysis (e.g., Alternatives Analysis, Reserve Analysis).
- **Question:** If you are estimating the cost for a work package by summing the detailed cost estimates of all activities within it, which estimating technique are you primarily using?

- **Key Outputs:**
  - **Cost Estimates:** Quantitative assessments of the probable costs required to complete project work.
  - **Basis of Estimates:** Supporting documentation outlining how cost estimates were derived (assumptions, constraints, confidence level, range).

Part 3: Setting the Financial Benchmark – Determine Budget

Purpose: The process of aggregating the estimated costs of individual activities or work packages to establish an authorized cost baseline.

1. **From Cost Estimates to Cost Baseline:**
   - Cost estimates for activities/work packages are aggregated.
   - **Contingency Reserves** (for identified risks) are added to these aggregated costs.
   - The sum becomes the **Cost Baseline**.
   - **Management Reserves** are added *on top* of the Cost Baseline to get the total **Project Budget**.
   - **Diagram Sketch:**
     Cost Estimates (Work Packages)
     - Contingency Reserves

= **Cost Baseline**

- Management Reserves

= **Project Budget**

2. **Artifacts (Outputs) of Determine Budget:**
    - **Cost Baseline:** (As defined above - the PM manages to this!)
    - **Project Funding Requirements:** Total funding requirements and periodic funding requirements (when money is needed).
    - **(Updates to) Project Documents.**

Part 4: Keeping Costs on Track – Control Costs and Resources

Purpose: The process of monitoring the status of the project to update the project costs and managing changes to the cost baseline.

1. **Key activities in Control Costs:**
    - Monitoring cost performance against the cost baseline.
    - Ensuring only approved changes are implemented.
    - Informing stakeholders of authorized changes affecting cost.
    - Preventing unapproved changes.
2. **Managing Change (Related to Costs):**
    - All changes that could impact the cost baseline must go through the formal integrated change control process.
3. **Progress Reporting:**
    - Communicating cost performance, variances, and forecasts to stakeholders. This often involves Work Performance Reports.
4. **Reserve Analysis (during Control Costs):**
    - Monitoring the status of contingency and management reserves to see if they are sufficient or if more/less is needed based on actual risk events or project performance.
5. **Earned Value Management (EVM):**
   A methodology that integrates scope, schedule, and resource measurements to assess project performance and progress.
    - **Planned Value (PV):** The authorized budget assigned to scheduled work.
      (Where *should* we be?)

- **Earned Value (EV):** The measure of work performed expressed in terms of the budget authorized for that work. (What did we *actually get done* in budget terms?)
- **Actual Cost (AC):** The realized cost incurred for the work performed on an activity during a specific time period. (What did we *actually spend*?)

6. **Key Formulas for Earned Value Analysis (EVA):**
   - **Cost Variance (CV):** EV - AC
     - *Positive CV is good (under budget); Negative CV is bad (over budget).*
   - **Schedule Variance (SV):** EV - PV
     - *Positive SV is good (ahead of schedule); Negative SV is bad (behind schedule).*
   - **Cost Performance Index (CPI):** EV / AC
     - *CPI > 1 is good (getting more value per dollar spent); CPI < 1 is bad.*
   - **Schedule Performance Index (SPI):** EV / PV
     - *SPI > 1 is good (progressing faster than planned); SPI < 1 is bad.*
   - **Estimate at Completion (EAC):** Forecast of total project cost. Several formulas, common ones:
     - EAC = BAC / CPI (If current variances are typical for the rest of project)
     - EAC = AC + (BAC - EV) (If future work will be done at the planned rate)
     - EAC = AC + Bottom-up ETC (If original estimates flawed, use new estimate for remaining work)
   - **Estimate to Complete (ETC):** Forecast of cost for remaining work.
     - ETC = EAC - AC
   - **Variance at Completion (VAC):** BAC - EAC
     - *Positive VAC is good (projected to finish under budget).*
   - **To-Complete Performance Index (TCPI):** Measure of cost performance needed for remaining work to meet a goal (e.g., BAC or EAC).
     - TCPI (to meet BAC) = (BAC - EV) / (BAC - AC)
     - TCPI (to meet EAC) = (BAC - EV) / (EAC - AC)

        - *TCPI > 1 means future work needs to be more efficient than planned.*
    - **Quick Check:** If EV = $100, PV = $120, AC = $90:
        - CV = $_____ CPI = _____ (Are we over/under budget?)
        - SV = $_____ SPI = _____ (Are we ahead/behind schedule?)

Part 5: Scenario & Application

Scenario: A project has a Budget at Completion (BAC) of $50,000. At a certain point:

- Planned Value (PV) = $20,000
- Earned Value (EV) = $18,000
- Actual Cost (AC) = $22,000

1. **Calculate:**
    - CV = _____
    - SV = _____
    - CPI = _____
    - SPI = _____
2. **Interpretation:** Based on your calculations, is this project currently over or under budget? Ahead of or behind schedule?

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3. If current variances are expected to continue, calculate the **EAC using the BAC / CPI formula.**
   EAC = _____

Key Takeaway: Cost management is a continuous process of planning, estimating, budgeting, and controlling costs. Tools like EVM provide powerful insights into project performance, enabling proactive management to keep the project on financial track.