SPM PRACTICAL

Q5: Compute Estimate At Completion (EAC) and Variance At Completion (VAC) if both SPI and CPI influence the project work when given variables are:

- **Budget At Completion (BAC)** = ₹22,000

- **Earned Value (EV)** = ₹13,000

- **Planned Value (PV)** = ₹14,000

- **Actual Cost (AC)** = ₹15,000

Draw a line chart for the same.

Variable	Symbol	Value
Budget at Completion	**BAC**	₹22,000
Earned Value	**EV**	₹13,000
Planned Value	**PV**	₹14,000
Actual Cost	**AC**	₹15,000

Step 1: Calculate CPI and SPI

$$CPI = \frac{EV}{AC} = \frac{13000}{15000} = 0.867$$
$$SPI = \frac{EV}{PV} = \frac{13000}{14000} = 0.929$$

Step 2: Calculate Estimate At Completion (EAC)

When **both CPI and SPI influence** the project, we use the formula:

$$EAC = \frac{BAC}{CPI \times SPI}$$
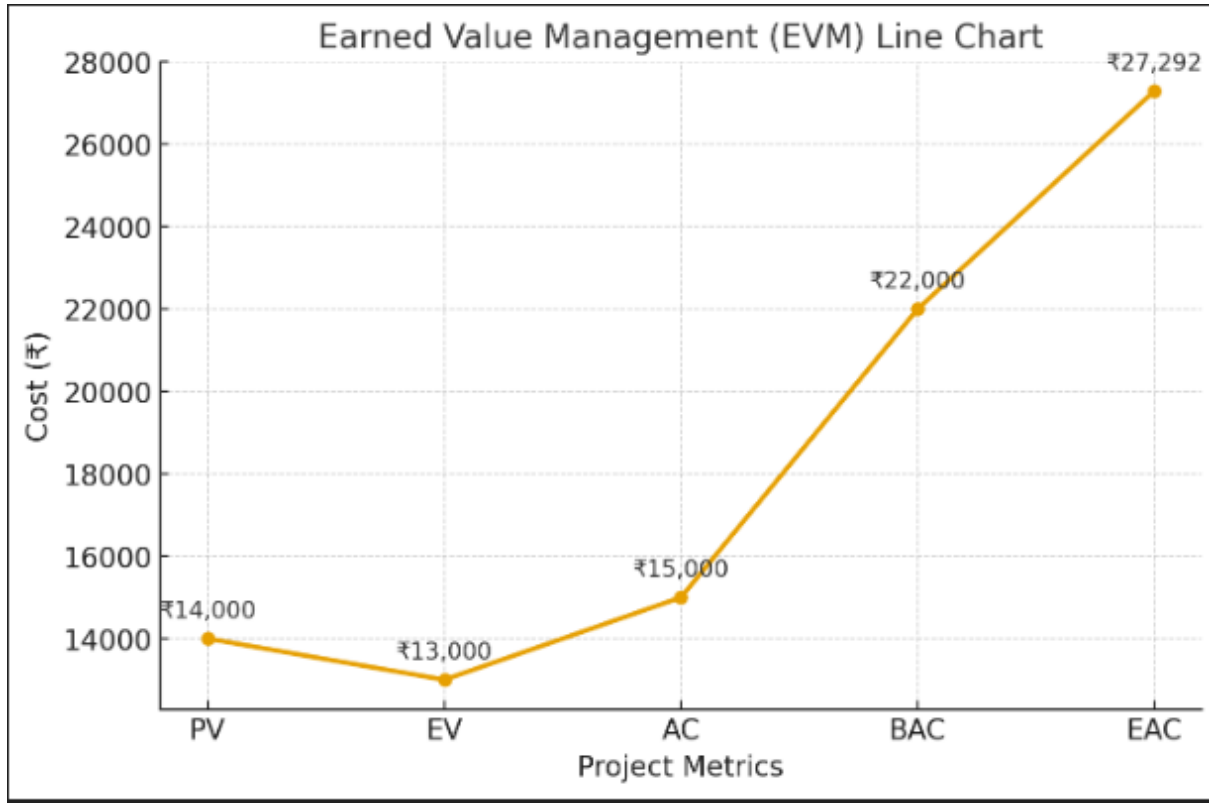$$EAC = \frac{22000}{0.867 \times 0.929} = \frac{22000}{0.806} = ₹27,292.04$$

☑ **EAC = ₹27,292 (approx)**

Step 3: Calculate Variance At Completion (VAC)

$$VAC = BAC - EAC$$

$$VAC = 22000 - 27292 = -₹5,292$$

▼ **VAC = –₹5,292** (negative means project will be **over budget**)

Earned Value Management (EVM) Line Chart

Q.4: Prepare a Gantt chart showing the percentage completion of tasks with current task status for **Online medicine delivery management system**. Assume suitable data and calculate **CPI** and **SPI** using **EVA method**.
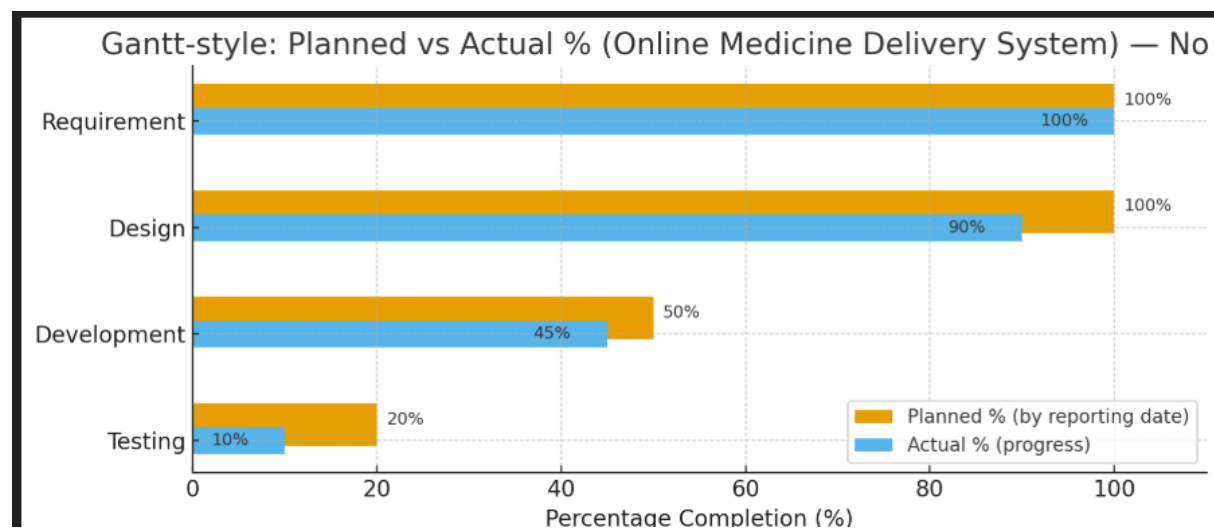
Task	Budget (₹)	Planned %	PV (₹)	Actual %	EV (₹)	AC (₹)
Requirement	2,000	100%	2,000	100%	2,000	2,000
Design	4,000	100%	4,000	90%	3,600	4,300
Development	10,000	50%	5,000	45%	4,500	8,800
Testing	4,000	20%	800	10%	400	1,000
TOTAL	**20,000**		**11,800**		**10,500**	**16,100**

EVA calculations (memorize these formulas)

- **CPI = EV / AC = 10,500 / 16,100 = 0.65** → *Cost performance poor (we're spending more than value earned).*

- **SPI = EV / PV = 10,500 / 11,800 = 0.89** → *Schedule behind (less work done than planned).*

(Optional)

- **EAC (if both CPI & SPI influence)** = BAC / (CPI × SPI) = 20,000 / (0.65 × 0.89) ≈ **₹34,463**

- **VAC = BAC − EAC = 20,000 − 34,463 = −₹14,463** (negative means over budget)

Gantt-style: Planned vs Actual % (Online Medicine Delivery System) — No

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Q.9: For the earned value management, assume a hydroelectric power plant. This project is divided into 2 phases, each lasting 1 year.

- The first phase of the project is valued at ₹100,000.00

- The second phase is valued at ₹50,000.00

- At the current state, 1 year of the project has passed and 90% of phase 1 has been completed

- The project team has completed work worth ₹80,000.00
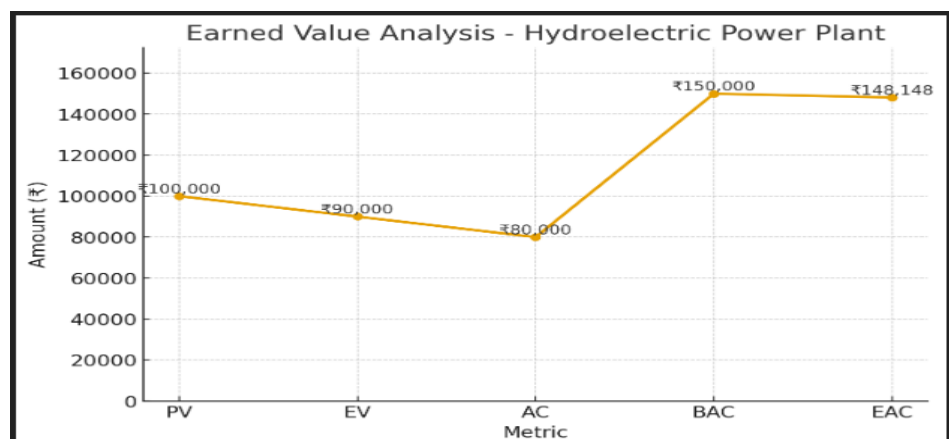
Task: Draw an EV analysis line chart for the same.

☐ Phase 1 value = ₹100,000 and Phase 2 value = ₹50,000 → **BAC = ₹150,000**.

☐ After 1 year (one full phase planned), **PV = ₹100,000** (planned to finish phase 1).

☐ Phase 1 is **90% complete**, so **EV = 0.90 × 100,000 = ₹90,000**.

☐ The line "project team has completed work worth ₹80,000" I used as the **actual cost spent (AC = ₹80,000)** — this interpretation fits EVA terms (AC is money spent).

Calculations (clean)

- PV = ₹100,000

- EV = ₹90,000

- AC = ₹80,000

- BAC = ₹150,000

- **CPI = EV / AC = 90,000 / 80,000 = 1.125** → cost efficient (we spent less than the value earned).

- **SPI = EV / PV = 90,000 / 100,000 = 0.90** → behind schedule (only 90% of planned work done).

(Optional)

- **EAC** (both CPI & SPI influence) = BAC / (CPI × SPI) = 150,000 / (1.125 × 0.90) ≈ **₹148,148.15**

- **VAC = BAC − EAC ≈ ₹1,851.85** (positive → still under overall budget projected)

Earned Value Analysis - Hydroelectric Power Plant

Q.6: Assume we are building a wind power plant.

- The project is set to be completed in **10 months** with an estimated cost of **₹500,000.00**

- The project has been running for **5 months**

- The team has spent **₹220,000.00**

- The team has completed an amount of work worth **₹255,000.00**

Task: Draw a line chart for the same. Analyze the cost using **EVA method**.

Given

- **BAC (estimated total cost)** = ₹500,000

- **Project duration** = 10 months

- **Months elapsed** = 5 → Planned progress = 5/10 = 50%

- **AC (actual money spent so far)** = ₹220,000

- **EV (value of work completed)** = ₹255,000

Step-by-step calculations

1. **Planned Value (PV)** = BAC × planned% = 500,000 × 50% = **₹250,000**

2. **Earned Value (EV)** = **₹255,000** (given)
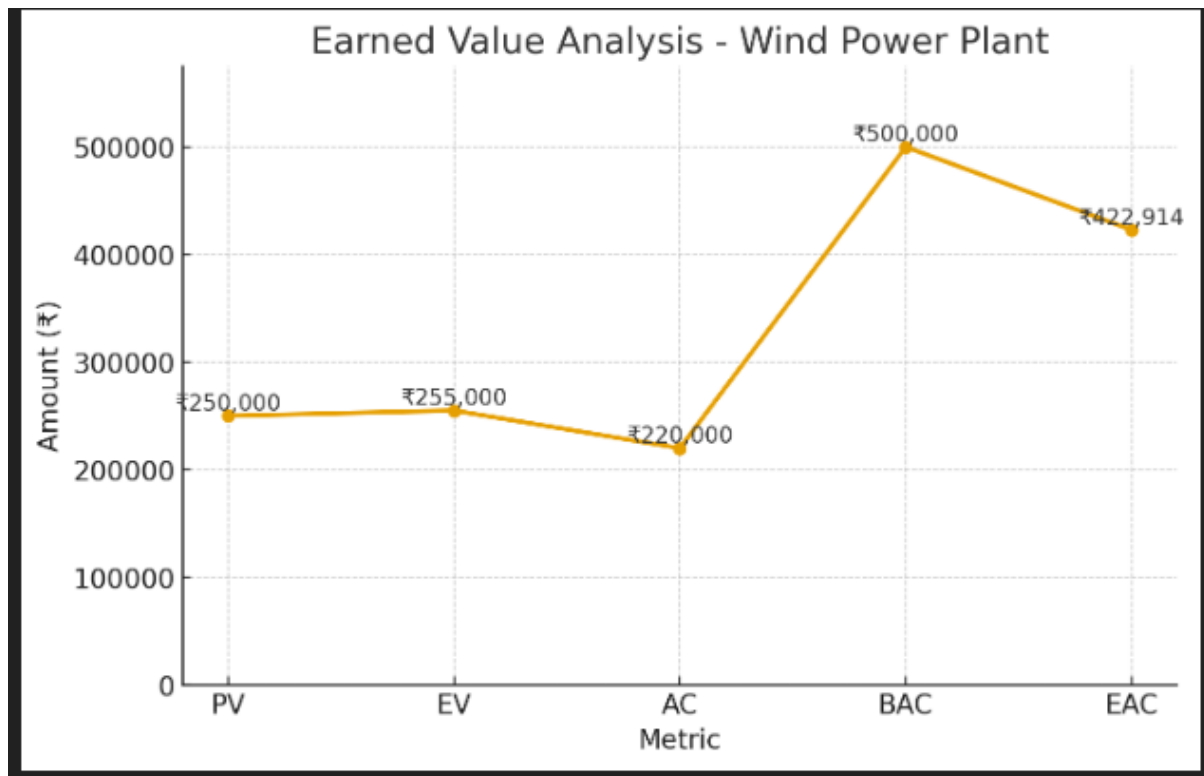
3. **Actual Cost (AC)** = **₹220,000** (given)

Performance indices:

- **CPI = EV / AC = 255,000 / 220,000 = 1.1591 ≈ 1.16**
  → CPI > 1 means **cost performance is good**: the team is getting more value per rupee spent.

- **SPI = EV / PV = 255,000 / 250,000 = 1.02**
  → SPI > 1 means **schedule performance is slightly ahead** of plan.

Optional forecasts:

- **EAC (both CPI & SPI influence)** = BAC / (CPI × SPI)
  = 500,000 / (1.1591 × 1.02) ≈ **₹422,914.05**

- **VAC = BAC − EAC ≈ 500,000 − 422,914 = ₹77,086** (positive → forecasted to finish **under budget**)

Earned Value Analysis - Wind Power Plant

Q.8: A project is undertaken where the work has to be completed within **60 days** with a budget of **₹20,000**.

- The cost breakdown per month is **₹10,000**

- The work scheduled in each month is **half of the total work** to be completed

- According to the progress reports, at the end of the **first month**, only **25%** of the total work has been completed and **50%** of the total budget has been spent

- For the completion of 25% work, the **actual cost incurred** is **50%** of the total budgeted cost

Task: Make **EV analysis**, draw **line chart** for the same.
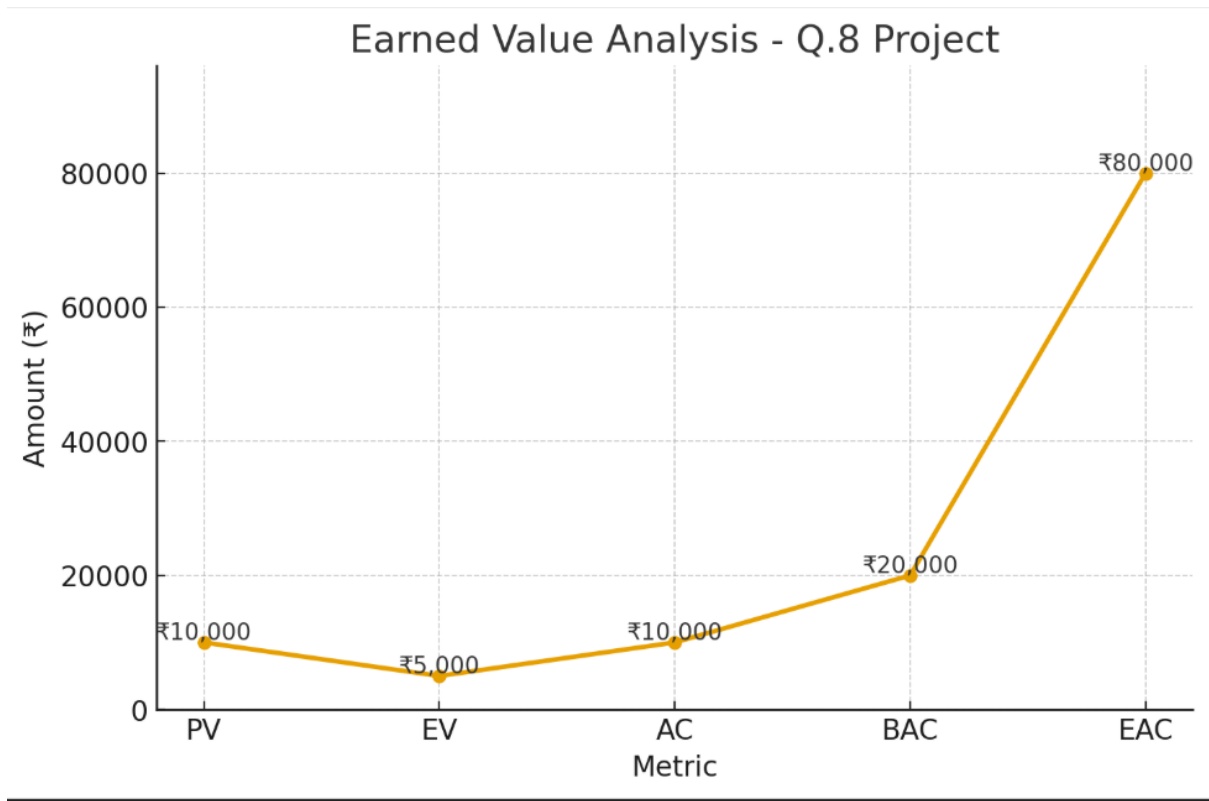
Given

- Project duration = 60 days ($\approx$ 2 months).
- **BAC = ₹20,000** (total budget).
- Cost breakdown per month = ₹10,000.
- Planned work: half the work each month → **PV (end of month 1) = 50% of BAC = ₹10,000**.
- Actual progress at end of month 1 = **25% of total work → EV = 25% of BAC = ₹5,000**.
- Actual cost spent for that work = **50% of BAC = ₹10,000 → AC = ₹10,000**.

Calculations

- **PV = ₹10,000**
- **EV = ₹5,000**
- **AC = ₹10,000**
- **CPI = EV / AC = 5,000 / 10,000 = 0.50** → *Cost performance is poor: getting only ₹0.50 of value per ₹1 spent.*
- **SPI = EV / PV = 5,000 / 10,000 = 0.50** → *Schedule performance is poor: only 50% of planned work completed.*

Optional forecast (if both CPI & SPI influence):

- **EAC = BAC / (CPI × SPI) = 20,000 / (0.5 × 0.5) = 20,000 / 0.25 = ₹80,000**
- **VAC = BAC − EAC = 20,000 − 80,000 = −₹60,000** (negative → project forecasted to be over budget by ₹60,000)

Earned Value Analysis - Q.8 Project

Q.12: Create a **project dashboard** for **Online clothes delivery management system** to show:

- Project summary
- Allocated resources
- Project completion cost and budget
- Allotted tasks

Make a **CPM** for the same.

Q.7: For the second Earned Value Management example, we are building a **solar power plant**.

- The project is divided into **5 stages**, each worth **₹20,000.00**
- Each stage is estimated to last for **1 month**

- **2 months** have passed

- **3 stages** have been completed for a cost of **₹80,000.00**
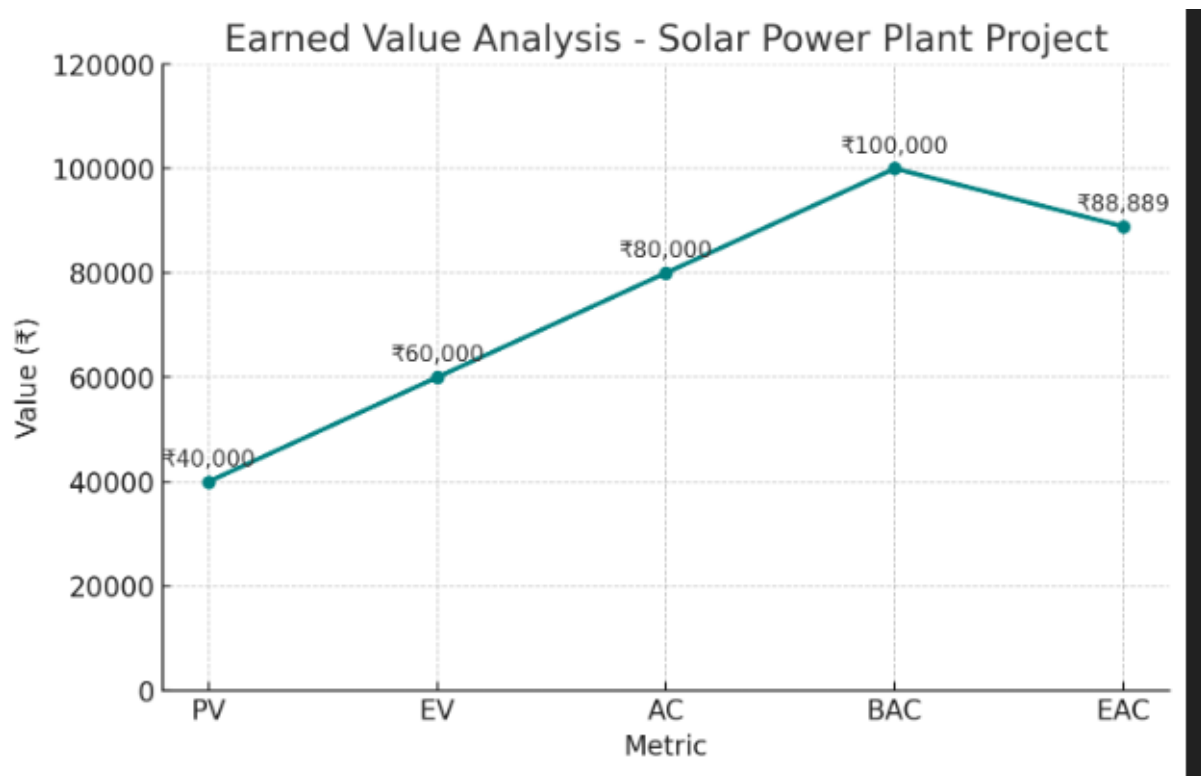
Task: Draw a **line chart** for the same

$$BAC = 5 \times ₹20,000 = ₹1,00,000$$

Given:

- **BAC = ₹1,00,000**

- **PV = ₹40,000** (after 2 months planned)

- **EV = ₹60,000** (3 stages completed)

- **AC = ₹80,000**

Calculations:

- **CPI = EV / AC = 0.75** → *Cost efficiency is low (over budget)*

- **SPI = EV / PV = 1.5** → *Ahead of schedule (faster progress)*
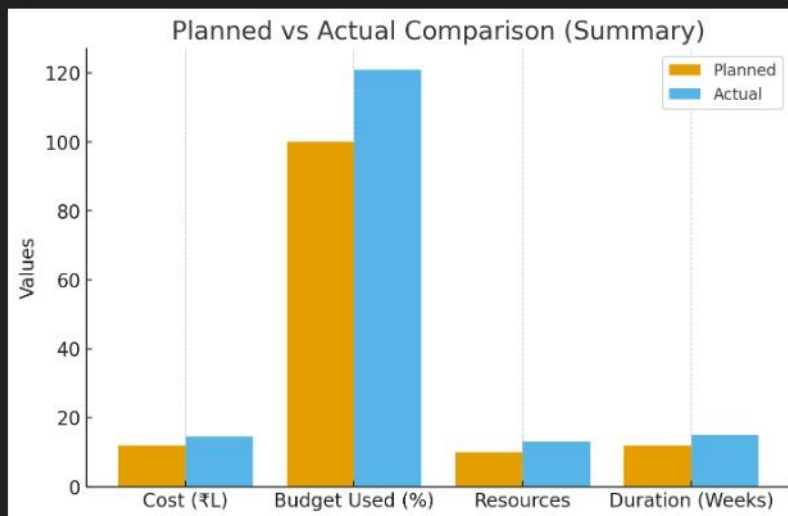
- **EAC = ₹88,889**, **VAC = ₹11,111**

Earned Value Analysis - Solar Power Plant Project

Q.3: Draw a **line chart** and **bar chart** for **Online medicine delivery management system**.

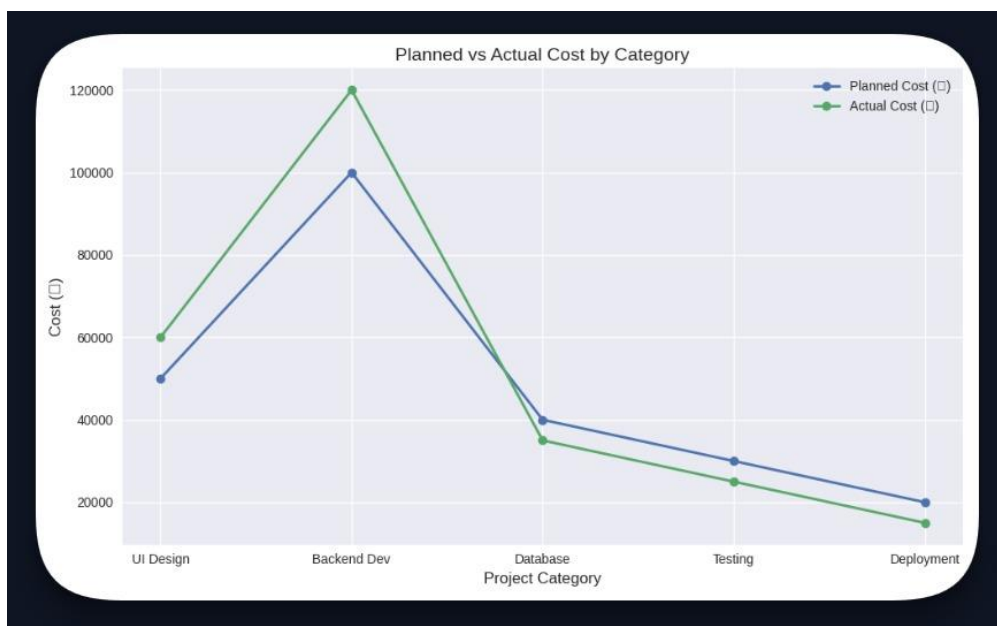Compare the **planned versus actual status** of:

- Project cost

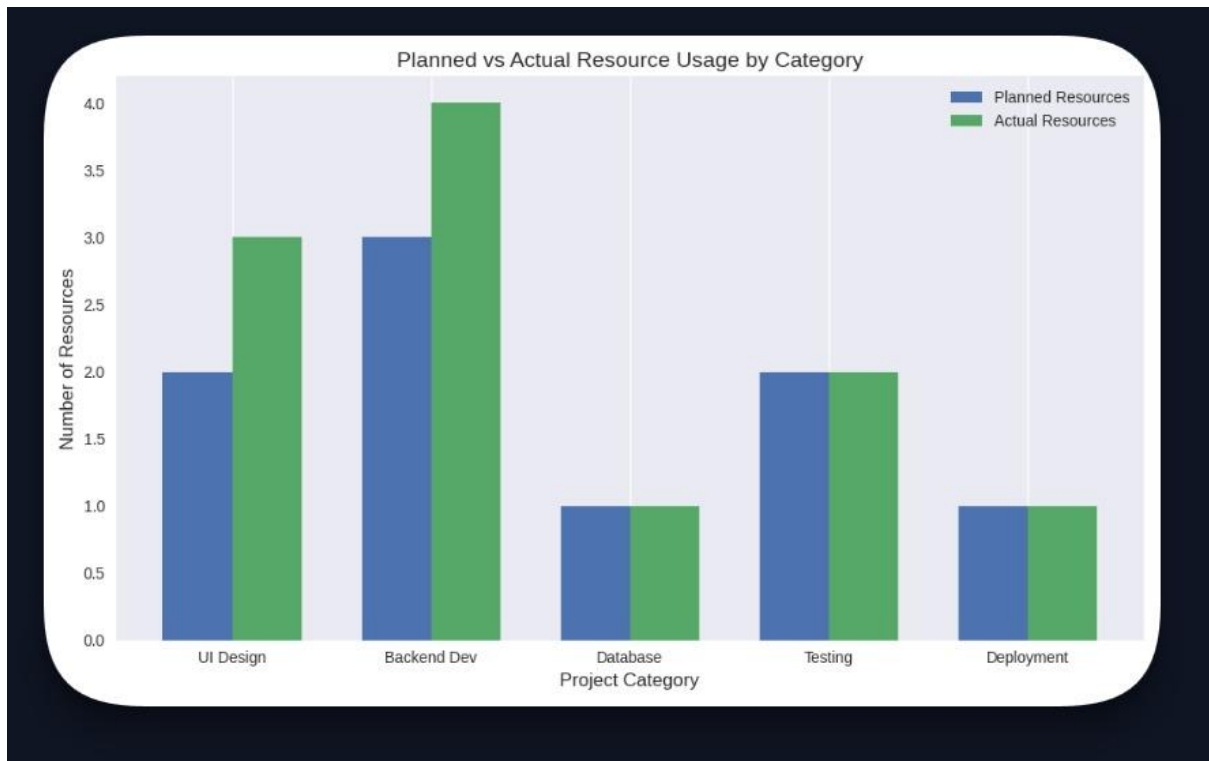- Budget

- Resources allocated

Assume suitable data and **make a CPM** for the same.

charts for your **Online Medicine Delivery Management System** project:

Chart 1: Planned vs. Actual Cost (in Lakhs) — shows how actual expenses exceeded planned

er project weeks.

Planned vs Actual Resource Usage by Category

Forward pass (ES / EF)

less

ID	Task	Duration	ES	EF
A	Requirements	4	0	4
B	Design	6	4	10
C	Procurement	8	4	12
D	Development	20	12	32
E	Integration	12	32	44
F	Testing	6	44	50
G	Deployment	4	50	54

Q.1: Generate a **pie chart** and **bar chart** for **Online movie ticket management system**.

Compare the **planned versus actual status** of:

- Project cost

- Budget

- Resources allocated

Assume suitable data and **make a CPM** for the same.

2. Draw a pie chart and line chart for **Online Food Delivery Management System**.
Compare the **planned versus actual status** of the **project cost**, **budget**, and **resources allocated**.
Assume suitable data and **make a CPM** for the same.

Q.1. Create a project dashboard for **Online Medicine Delivery Management System** to show:

- Project summary

- Allocated resources

- Project completion cost and budget

- Allotted tasks

Make a **CPM** for the same.

Q.10. Create a project dashboard for **Online Home Delivery Management System** to show:

- Project summary

- Allocated resources

- Project completion cost and budget

- Allotted tasks

Make a **CPM** for the same.