

QUERY 01:-

PROBLEM STATEMENT:-

The problem is to determine the least-cost operations and replacement schedule for Mr. Sameul's business.

PROBLEM FORMULATION AND EVALUATION :-

- Total vans = $20 + 4 = 24$
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backup vans
- ~~32~~ Total technicians = 32
- Each technician is assigned to a van and each van has only one/two technicians assigned to it.
- Day, night and weekend coverage using technicians.

SYNTHESIS OF POSSIBLE SOLUTIONS:-

ALTERNATE 01	ALTERNATE 02	ALTERNATE 03
<ul style="list-style-type: none"> • Use 10 ^{vans and 16} technicians during day. • Use 10 technicians vans and 16 technicians during night. • Keep remaining 4 vans as backup. 	<ul style="list-style-type: none"> • Use 12 vans and 16 technicians during day time • Use 12 vans and 16 technicians during night. • No backup 	<ul style="list-style-type: none"> • Use 13 vans and 18 technicians during day time. • Use 8 vans and 11 technicians during night. • 3 vans and 3 technicians as backup

EVALUATION OF ALTERNATIVES:-

Upon careful consideration of each alternative solution, I conclude that Alternate 3 stands out as most optimal choice b/c of the following reasons:

- ① Given the increased workload during daytime, it is logical to deploy more vans and technicians during this period.
- ② Conversely, the night-time workload is lower, justifying the utilization of fewer vans and technicians during those hours.
- ③ Maintaining 3 vans and 3 technicians as backup proves to be sufficient for unforeseen circumstances.

This alternative also facilitates the weekend coverage. By leveraging the lower workload during night shifts, employees can contribute to weekend operations. Assigning a designated van to each area helps minimize fuel costs.

QUERY 02:-

PROBLEM STATEMENT:-

Improving the operations and performance of the firm is the problem.

PROBLEM FORMULATION AND EVALUATION:-

- Analyze the feasibility of each alternative presented by project management team.
- Estimate the cost associated with each alternative.
- Estimate the benefits/return from each alternative. (Principle 4).
- Identify the risk associated with each alternative (Principle 4).

SYNTHESIS OF POSSIBLE SOLUTIONS:-

ALTERNATIVE ①:-

- Upgrade existing employee facilities.
- This could involve investing in new equipment, improving workspace design, enhancing recreational facilities, or providing better tools and software.
- The goal would be to improve employee productivity and job satisfaction.

ALTERNATIVE ②:-

- Hiring new employees.
- This could involve recruiting highly experienced professionals who can bring in fresh ideas and skills.

- This new hires could either replace existing employees or be an addition to the current work force.

ALTERNATIVE ③:-

- Combination of Upgrading facilities and hiring.
- This involves both of above alternatives.
- The combination could provide a balance between improving current operations and bringing in new skills and ideas.

EVALUATION ⑤ OF ALTERNATIVES:-

Alternative 3 could potentially be a good choice as it provides a balance between b/w current operations and bringing in new skills and ideas.

However, whether it's the best choice depends on various factors.

- Cost:- Can organization afford both the the upgrade and the new hires? But seeing it from 1st principle of EE, we can assume that it may be costly but this investment will benefit the organization in future.
- Benefits:- Will the combined benefits of upgraded facilities might improve productivity and new hires outweigh the costs? Well, upgraded facilities might improve productivity and morale among current employees, while new

hires could bring in fresh ideas and skills. (ii)

• **Feasibility:** Does the organization have the resources to implement both parts of this alternative? This includes not just financial resources but also time, manpower and expertise. (vi)

• **Risk:** What potential threats and risks are involved in this alternative? e.g. there could be risk related to integrating new employees into the team or technical risks associated with the facility upgrades. (iv)

By carefully considering these factors, I think alternative 3 is a good choice for the organization.

QUERY 03:-

PROBLEM STATEMENT:-

The problem here is to determine whether the offer is financially beneficial or not.

PROBLEM FORMULATION AND EVALUATION:-

The given problem can be evaluated with the following factors.

(i) Feasibility Analysis:-

Assess the technical economic and operational feasibility of installing new HVAC equipment.

(ii) Cost Estimation:-

Estimate the cost associated with the offer. This includes the cost of the service contract (\$15,000 per year) and the potential cost of splitting the savings with company.

(iii) Benefit Analysis:-

Estimate the potential savings from the new HVAC equipment.

(iv) Risk Analysis:-

Identify the potential risks associated with the offer. For example, what if the savings are less than expected? what if the equipment fails or requires additional maintenance.

SYNTHESIS OF POSSIBLE SOLUTIONS:-

ALTERNATE ①:- - Take the offer

First alternative is to take the offer.

Cost of equipment: \$0

Savings deduced: 50%

Service contract: \$15,000 / year

ALTERNATE ②:- - Reject the offer

Second alternative is to reject the offer and buy the equipment yourself.

Cost of equipment: >\$0

Savings deduced: 0%

Service contract: No service contract

EVALUATION ~~OF~~ ALTERNATIVES:-

ALTERNATE ③:- Negotiate the offer

If certain aspects of the offer are not favourable, then we can negotiate them according to our savings.

EVALUATION ③ OF ALTERNATIVES:-

If we evaluate the above alternates on cost basis then we can conclude that it isn't a "free lunch". The two big reasons are:

- ① The company offering the services seems to have high maintenance rates, which might be why they've proposed this offer.
- ② The cost of the equipment might be less than the savings they're claiming.

Given these reasons, alternate ^①~~②~~ should be rejected. Alternate ② and ③ are valid in terms of saving money.