

SSSOM QBank Helper

Virupakshan K

1

- a) Discuss how “Taguchi Method” helps in robust facility design of a small hotel
- b) Distinguish Histogram and Pareto Chart used as quality tools.

1

- a) Explain with example how “Poka-Yoke” Failsafing helps in quality service by design
- b) Explain how “Taguchi Methods” helps in robust facility design

ANSWER:

a) Explain with example how “Poka-Yoke” Failsafing helps in quality service

Poka-Yoke (Failsafing): These are low-cost, "foolproof" mechanisms to prevent mistakes by either the employee or the customer.

•*Server Example:* A **specially designed scoop at McDonald's** ensures every customer receives the exact same portion of fries, preventing human error in measurement.

•*Customer Example:* **Height bars at amusement parks** act as a physical check to ensure riders meet safety requirements before they even get in line



Airlines use this poka-yoke device to alert passengers to the size limits of carry-on luggage. Myrleen Ferguson Cate/PhotoEdit

b) Explain how “Taguchi Methods” helps in robust facility design

Taguchi Methods: This involves designing a service to be "robust" so it can still perform well even under adverse conditions.

For instance, our budget hotel uses **individual air-conditioning units** for each room rather than one central system; if one unit fails, only one room is affected, rather than the entire hotel losing service

2

- a) Explain how Histogram and Pareto Chart help as quality tools. (4 marks)
- b) Explain the 3-component cycle achieved by ISO 9001. (4 marks)

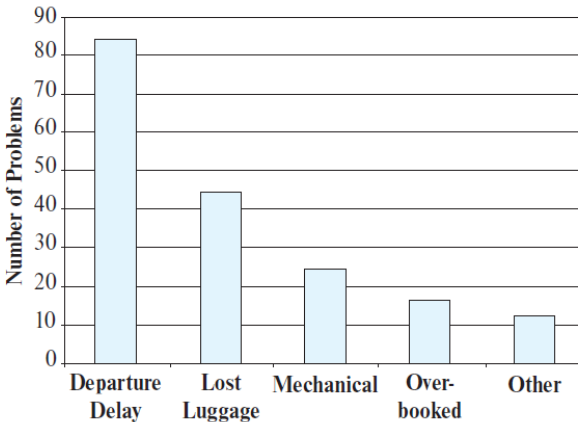
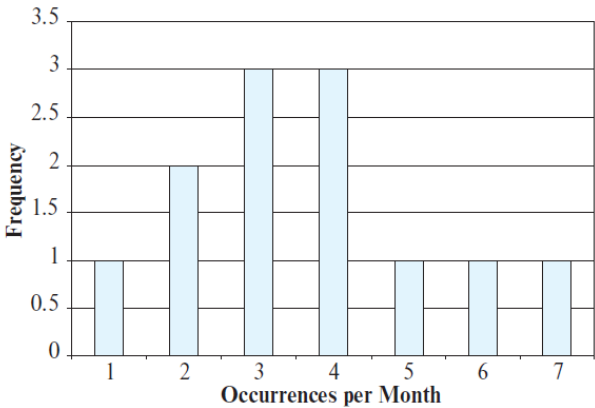
ANSWER:.

a) How Histogram and Pareto Chart help as quality tools

A **histogram** is used as a quality tool to visualize the distribution and variation of process measurements, helping identify patterns, defects, and potential quality problems.

Pareto chart helps identify and prioritize the most significant causes of defects or problems, following the 80/20 principle, so quality improvement efforts can focus on the vital few causes.

FIGURE 7.4 Histogram of Lost Luggage



b) Explain the 3-component cycle achieved by ISO 9001

The **three-component cycle** achieved by ISO 9001:

1. **Planning**. Activities affecting quality must be planned to ensure that goals, authority, and responsibility are both defined and understood.
2. **Control**. Activities affecting quality must be controlled to ensure that specified requirements at all levels are met, problems are anticipated and averted, and corrective actions are planned and carried out.
3. **Documentation**. Activities affecting quality must be documented to ensure an understanding of quality objectives and methods, smooth interaction within the organization, feedback for the planning cycle, and to serve as objective evidence of quality system performance.

2

- a) Explain with a diagram the four steps in PDCA Cycle.
- b) Explain Define, Measure, Analyze, Improve and Control phases in six sigma.

7

- What are Deming's 3 principles for continuous improvement
- Briefly explain the 4 steps in PDCA Cycle.
- Draw a graph for Time vs Quality level with Deming's wheel.
- List any 3 Quality Tools used in continuous improvement process
- Draw and explain Cause and effect diagram.

ANSWER:

- What are Deming's 3 principles for continuous improvement

Deming's teachings consisted of **three principles**:

- Customer satisfaction.**
- Management by facts.**
- Respect for people.**

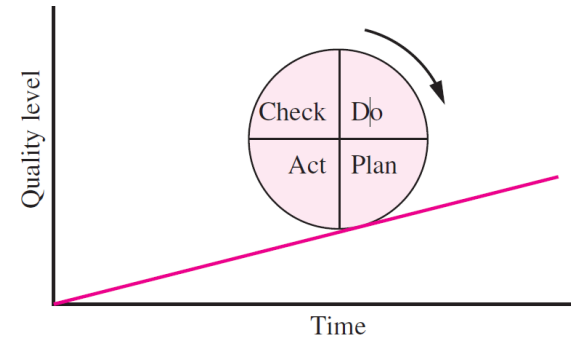
- Briefly explain the 4 steps in PDCA Cycle.

Plan-Do-Check-Act (PDCA) Cycle

Deming's approach, represented by a wheel, consists of **4 steps**:

- plan**, select and analyze the problem;
- do**, implement the solution;
- check** the results of the change; and
- act** to standardize the solution and reflect on the learning.

- Draw a graph for Time vs Quality level with Deming's wheel.



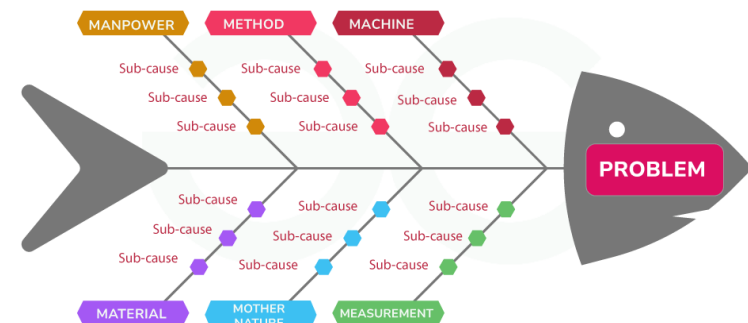
- List any 3 Quality Tools used in continuous improvement process

LIST OF QUALITY TOOLS:

- Check Sheet**
- Run Chart**
- Histogram**
- Pareto Chart
- Flowchart
- Cause-and-Effect Diagram
- Scatter Diagram
- Control Chart

- Draw and explain Cause and effect diagram.

Cause-and-effect analysis a process using a chart shaped like a **fishbone** to discover the root cause of a service quality problem



2

- a) Explain briefly the DMAIC cycle in Six Sigma.
- b) Explain any 4 Roles and responsibilities of Six Sigma organization

ANSWER:

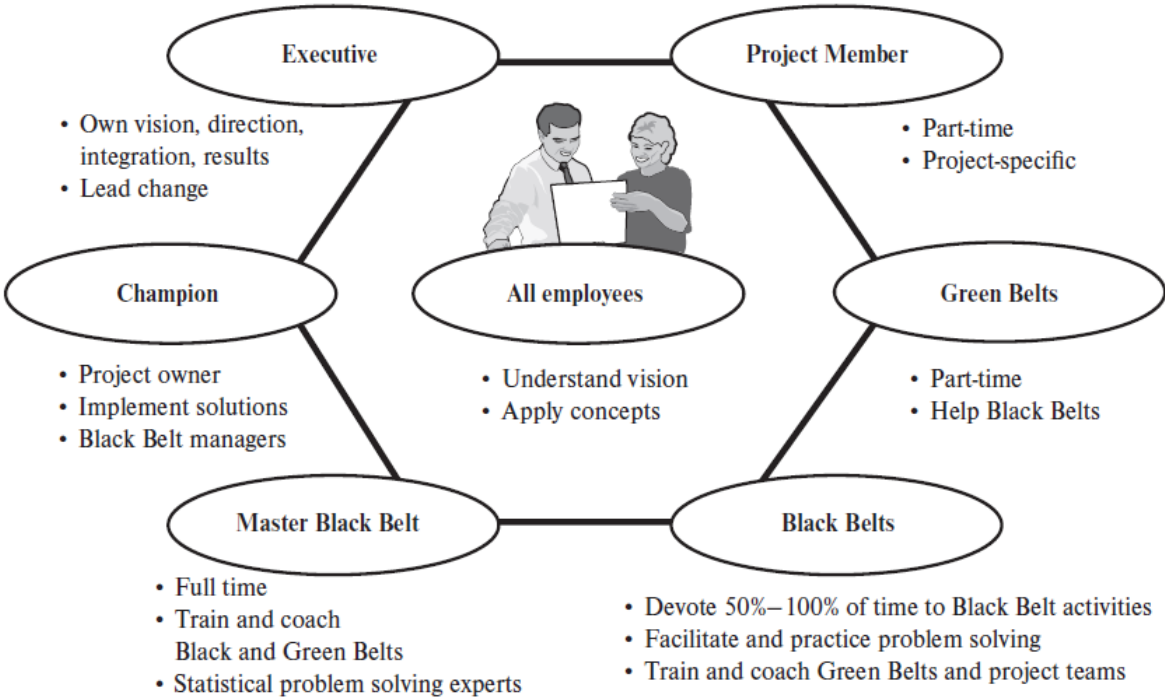
a) Explain briefly the DMAIC cycle in Six Sigma.

Six Sigma projects generally follow the DMAIC cycle.

Phase	Purpose
D – Define	Define the problem and customer requirements.
M – Measure	Collect data and measure current performance.
A – Analyze	Identify the root causes of defects.
I – Improve	Implement solutions to remove defects.
C – Control	Monitor the process to maintain improvements.



b) Explain any 4 Roles and responsibilities of Six Sigma organization



Six Sigma Organization Roles and Responsibilities

3

- a) Explain how a restaurant can use “Increasing customer participation” strategy to help manage capacity
- b) Explain how a food court in a mall and different airlines in airport use “Sharing Capacity” strategy for managing capacity.

d) How “Increasing customer participation” help manage capacity

The strategy of **increasing customer participation** is illustrated best by the fast-food **restaurants** that have **eliminated personnel who serve food** and clear tables.

The **customer (now a coproducer)** not only places the order directly from a **limited menu** but also clears the table after the meal.

Naturally, the **customer expects faster service and less-expensive meals** to compensate for this help; however, the **service provider benefits in many subtle ways**.



e) Where can “Sharing Capacity” strategy be applied for managing capacity?

- A service delivery system often **requires a large investment** in equipment and facilities.
- During periods of underutilization, it may be possible to find other uses for this capacity.
- **Example 1:** At small **airports**, **airlines** share the same **gates, ramps, baggage-handling equipment and ground personnel**.
- **Example 2:** At a **mall food court**, vendors share the same dining area and other facilities.



- a) Distinguish Qualitative methods and Quantitative methods of forecasting demand on the basis of meaning, data required, nature, and usage.
- b) “Developing complementary services is a natural way to expand one’s market” – explain for cinema hall
- c) List any two Capacity Management strategies

4

- a) Explain with example any two types of forecasting service demand
b) Distinguish Qualitative methods and Quantitative methods of forecasting demand.

ANSWER:

a) Explain with example any two types of forecasting service demand

1) Short-Term Forecast

Duration

Days to 3 months

Used for

- Staff scheduling
- Inventory
- Daily operations

Example

Predict customers tomorrow.

2) Medium-Term Forecast

3 months to 2 years

Used for

- Hiring
- Marketing
- Budgeting

Example

Forecast admissions next semester.

3) Long-Term Forecast

More than 2 years

Used for

- New hospitals
- Airports
- Hotels
- Expansion

b) Distinguish Qualitative methods and Quantitative methods of forecasting demand.

Basis	Qualitative Methods	Quantitative Methods
Meaning	Forecasting based on opinions, experience, and judgment.	Forecasting based on historical data and mathematical/statistical techniques.
Data required	Mainly expert opinions and market information.	Requires numerical historical data.
Nature	More subjective.	More objective and data-driven.
Use	Useful when past data is unavailable or for new products.	Useful when reliable past data is available.
Examples	Expert opinion, Delphi method, market surveys.	Moving average, exponential smoothing, regression analysis.
Example	A tea shop owner predicts higher tea demand based on his experience and customer feedback.	A tea shop uses the last 12 months' sales data to mathematically forecast next month's tea demand.

8

- List any 3 Capacity Management strategies
- Explain how Reservation System and overbooking help manage demand
- Give an example for "Promoting off-peak Demand" strategy
- Explain how complementary services help in demand management strategy.
- Justify "offering price incentives" help manage demand.

ANSWER:

a) List **any 3** Capacity Management strategies

- Defining Service Capacity
- Daily Workshift Scheduling
- Daily Workshift with constraints
- Increasing Customer Participation
- Creating Adjustable Capacity
- Sharing Capacity

b) Explain how Reservation System and overbooking help manage demand

Taking reservations **presells** the potential service.

As reservations are made, additional **demand is deflected** to other time slots at the same facility or to other facilities within the same organization. e.g. **Movie tickets**

Faced with **flying empty seats** because of **the no-shows**, airlines adopted a strategy of **overbooking** i.e. by accepting reservations for more than the available seats.

RISK OF OVERBOOKING: A negative impact on your brand, decreased customer loyalty, frustration on behalf of the guests, and lower staff morale.

c) Give an example for "Promoting off-peak Demand" strategy

Creative use of **off-peak capacity** results from seeking different sources of demand.

One example is use of a resort hotel during the off-season as a retreat location for business or professional groups.

Tamil Nadu
"AADI SALE".



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d) Explain how complementary services help in demand management strategy.

e.g. Cinema Halls having Popcorn counters.

Developing complementary services is a natural way to **expand one's market**, and it is particularly attractive if the new demands for service are **contracyclical** (i.e., **when the new service demand is high, the original service demand is low**).



e) Justify "offering price incentives" help manage demand.

Implementing **price incentives** is a powerful strategy to motivate both customers and employees and achieve desired goals.

There are many examples of differential pricing.

- CT Scan – Day Rs.1500 & Night Rs.1000
- Off-season hotel rates at resort locations.
- Shopping Mall parking charges on Weekends and Weekdays

5

- a) Expand PERT and draw a sample PERT diagram indicating the task, most likely time, pessimistic time, optimistic time, slack time, dependency and critical path.
- b) Explain any two stages of team development in Project Management

6

- What is PERT?
- What are the steps in creating a PERT chart?
- Draw a sample PERT diagram indicating the task, most likely time, pessimistic time, optimistic time, slack time, dependency and critical path.

ANSWER:

a) What is PERT?

- PERT stands for Program Evaluation and Review Technique.**
- It provides a visual representation of a project's timeline and breaks down individual tasks.
- Unlike Gantt charts, PERT charts focus on task dependencies and critical paths.

b) What are the steps in creating a PERT chart?

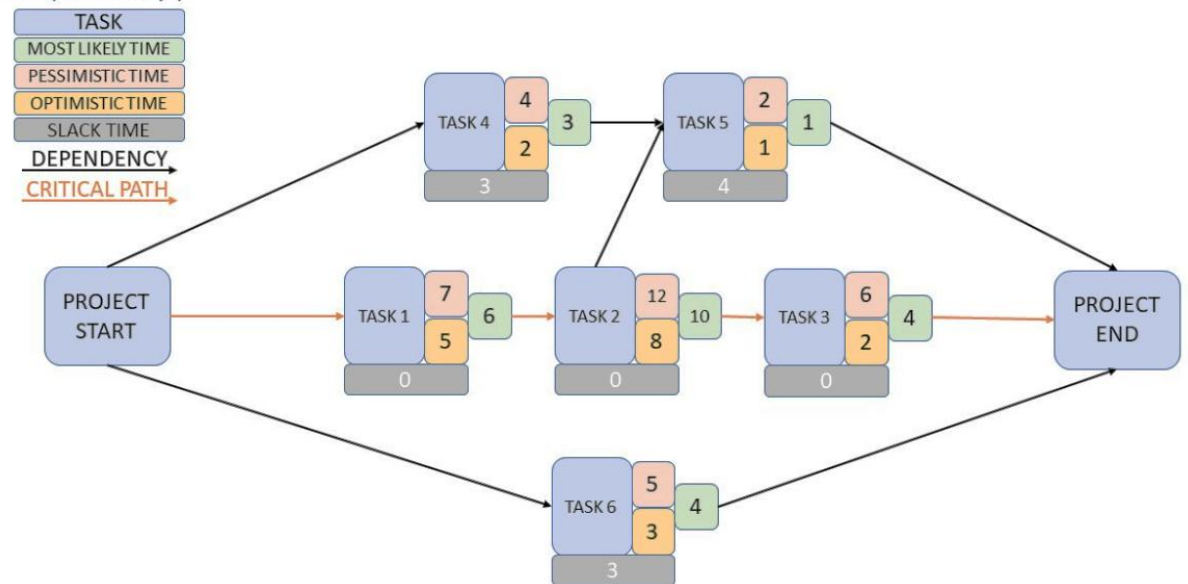
- Step 1: Identify Project Tasks
- Step 2: Define Task Dependencies
- Step 3: Map Out the Diagram
- Step 4: Estimate Time for Each Task.
- Step 5: Share with Stakeholders

c) Draw a sample PERT diagram indicating the task, most likely time, pessimistic time, optimistic time, slack time, dependency and critical path.

KEY (time in days)



KEY (time in days)



5

Explain briefly i) Forming, ii) Storming, iii) Norming and iv) Performing stages of team development in Project Management

ANSWER:

Forming is the phase when team members get acquainted, similar to the early “courting” phase of a relationship.

In **Storming** stage, work begins in earnest and reality sets in, although it does not necessarily match expectations.

Norming: After passing through the storming stage, project team cohesion begins to develop and the operating environment is accepted.

In the final **Performing** stage, the team is highly committed and eager to achieve the project objectives.

Stages of Team Development in Project Management

Forming: Team members come together, understand the **project objectives, roles, responsibilities, and expectations**. They are generally polite and cautious with each other.

Storming: Team members may have **disagreements, conflicts, or differences of opinion** about roles, methods, or responsibilities. The project manager helps resolve conflicts.

Norming: The team develops **mutual understanding, cooperation, rules, and trust**. Members begin working together effectively toward the project goals.

Performing: The team becomes **highly productive and self-managed**. Members collaborate efficiently, solve problems, and focus on achieving the project objectives.

6

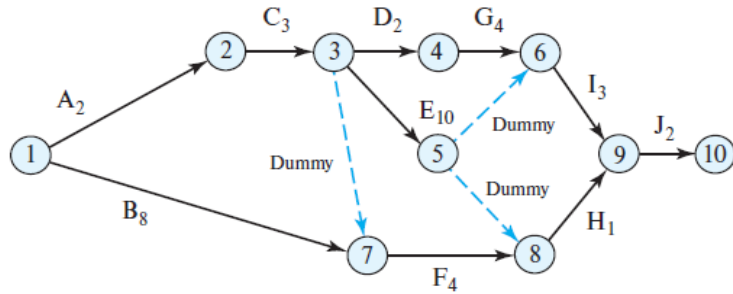
- a) Explain Activity-on-Arrow (AoA) in project network
- b) Explain briefly how Critical Path Method (CPM) is used in Project Management.

6

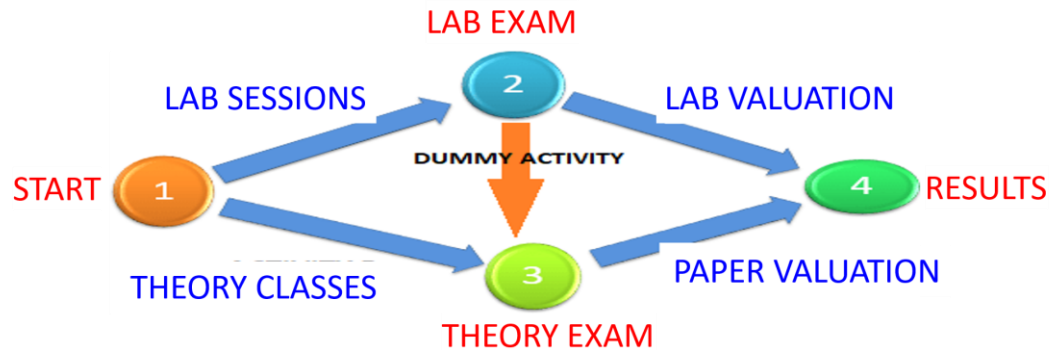
- Explain Activity-on-Arrow (AoA) in project network (4 marks)
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ANSWER:

a) Explain Activity-on-Arrow (AoA) in project network



Activities are indicated on **arrows** & **Milestones** on **nodes in a circle**



Activity on Arrow Diagram (AoA): Here, activities are indicated on arrows and milestones on nodes in a circle. AOA uses only finish-to-start task dependency.

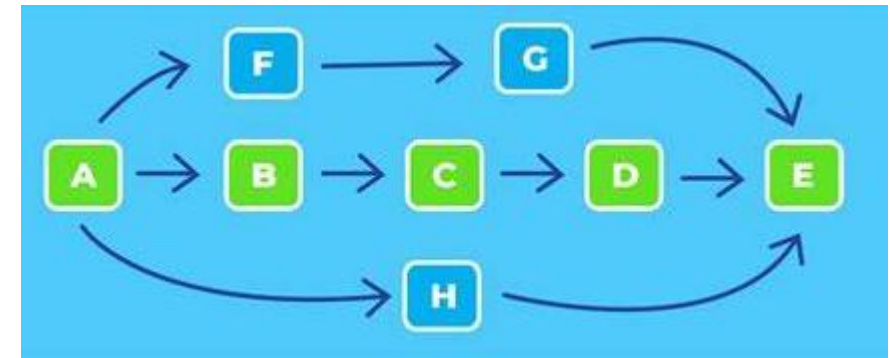
b) Explain briefly how Critical Path Method (CPM) is used in Project Management.

The **Critical Path Method (CPM)** is a project management **technique** used to identify activities that are **critical** in terms of time. Here's how it works:

- Breakdown of Tasks:** First, the project is broken down into individual work tasks.
- Flow Chart:** These tasks are displayed in a flow chart (network diagram).
- Estimated Time Frames:** Each task is assigned an estimated time frame.
- Critical Path Identification:** The critical path is determined by identifying the sequence of scheduled activities that determine the overall project duration.
- Critical Tasks:** Tasks on the critical path are time-sensitive and must be completed as planned.
- Project Duration:** The project duration is calculated based on the critical path.

To visualize this, project managers create a diagram with boxes representing tasks. **Tasks on the critical path have no float time** (must be completed as planned), while other tasks can be completed in parallel.

The longest path through the network diagram represents the **critical path**.

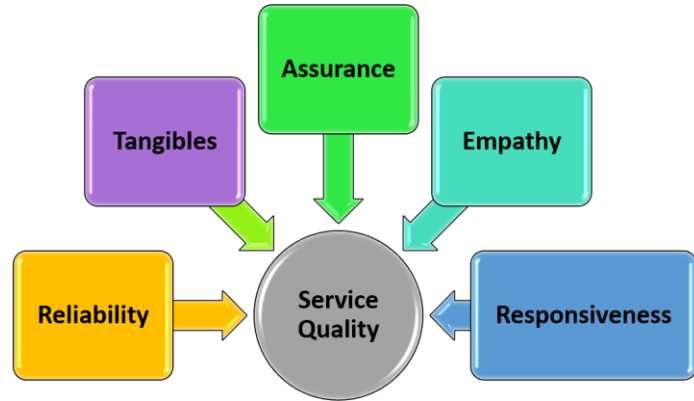


- a) What does 'RATER' dimensions in Service Quality mean
- b) Explain how "Poka-Yoke" Failsafing helps Airline industry
- c) List any 3 Quality Tools used in continuous improvement process
- d) Draw and explain Fish-bone diagram.

1

- Explain briefly the 5 dimensions in Service Quality. (4 marks)
- Explain briefly the 5 steps in Walk-through Audit process (4 marks)

ANSWER:.



a) RATER : 5 dimensions in Service Quality

Reliability: Consistency in delivering the xpromised service without errors or delays

Assurance: The competence, courtesy, and credibility of service providers.

Tangibles: The physical evidence of the service, such as facilities, equipment, and appearance

Empathy: Understanding and caring for customers' individual needs and concerns.

Responsiveness: Promptness in addressing customer inquiries, requests, and issues.

b) 5 steps in Walk-through Audit

- Flowchart** the service delivery process from the customer's perspective.
- Design, test, and administer** questionnaire to a sample of customers, management personnel, and/or customers at benchmark organizations.
- Summarize and analyze** survey results with emphasis on low rating relative to benchmark firms and gaps between management and customers.
- Determine **deficiencies** and implement improvements.
- Repeat** for ongoing improvement.

1

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ANSWER:

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Taguchi Methods: This involves designing a service to be "robust" so it can still perform well even under adverse conditions.

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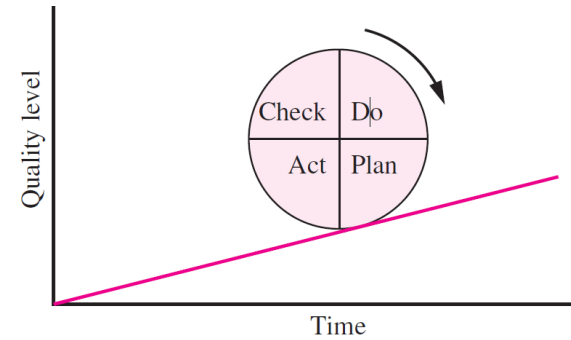
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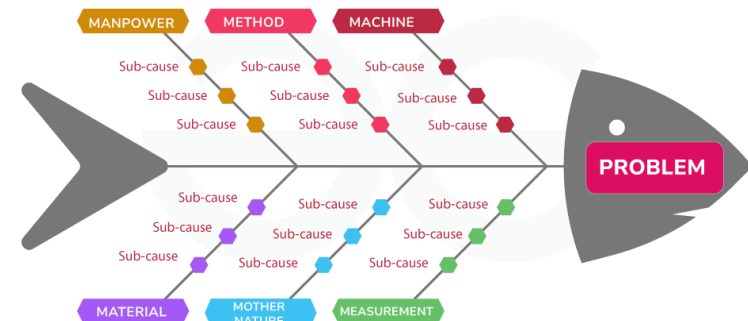
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8

- a) Explain with example “Chase Demand”.
- b) List any 3 Demand Management strategies
- c) Explain how “Leveling Capacity” applies to a bakery.
- d) Justify how “Promoting off-peak Demand” strategy increases A/C sales in Chennai

3

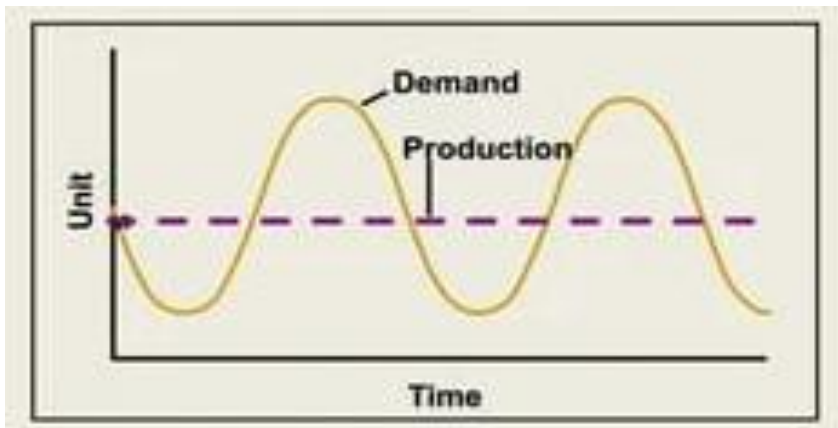
- a) A bakery decides how many breads per day based on “Leveling Capacity”. Explain this.
- b) Explain with example “Chase Demand”.

ANSWER:

a) A bakery decides how many breads per day based on “Leveling Capacity”. Explain this.

Leveling capacity means fixing capacity (production) at a constant level (generally the average demand) throughout a period regardless of fluctuations in forecast demand.

Bakery using Leveling Capacity: It means the bakery maintains a stable daily production level by producing approximately the same number of breads each day, even when daily demand varies. This helps balance workload, utilize resources efficiently, reduce production fluctuations, and maintain consistent operations.



b) Explain with example “Chase Demand”.

Chase Demand: It means adjusting the **production or service capacity according to the changing customer demand**.

Example – Tea Shop: A tea shop normally serves **100 cups of tea per day**. During a rainy day, demand increases to **150 cups**, so the shop prepares more tea and may add extra staff. On a less busy day, demand falls to **70 cups**, so the shop reduces preparation. Thus, the tea shop **changes its capacity to match customer demand**.

8

- a) List any 3 Demand Management strategies (3 marks)
- b) Explain how defining service capacity help managing capacity (3 marks)
- c) Distinguish Daily workshift scheduling and Daily work-shift with constraints in managing capacity (3 marks)
- d) Explain with an example how “Increasing customer participation” help manage capacity (3 marks)
- e) Where can “Sharing Capacity” strategy be applied for managing capacity? (3 marks)

ANSWER:.

a) 3 Demand Mgmt Strategies

1. Customer-Induced Variability
2. Segmenting Demand
3. Offering Price Incentives
4. Promoting Off-Peak Demand
5. Developing Complementary Services
6. Reservation Systems and Overbooking

b) Service Capacity help Managing Capacity

Service Capacity is defined in terms of an achievable level of output per unit time.

Notice that for **service providers** the measure of capacity is based on a **busy employee** and **not on observed output** that must always be less than capacity.

Example : Number of Answer Sheets corrected by a Teacher per Day.

c) Distinguish Daily workshift scheduling and Daily work-shift with constraints

Daily Workshift scheduling is an important staffing problem for many service organizations that face **cyclical demand**, such as telephone companies, hospitals, BPOs, and police departments.

The general approach is:



Daily Workshift with constraints:

- Many public services such as police, fire protection and emergency hospital care must be **available 24 hours a day**, every day of the week.
- For these organizations, a typical **employee works 5 days a week** with 2 consecutive days off each week, but not necessarily Saturday and Sunday.
- ❖ Management is interested in **developing work schedules** and meeting the varying employee requirements for weekdays and weekends **with the smallest number of staff members** possible.
- This problem **can be formulated** as an **Integer Linear Programming (ILP) Model**

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