Chapter 2: Product Planning and Customer Needs

Repeated Questions:

1. Customer Needs and Interviewing:

- **Q.** Why is customer need very important for the product development process? **(SUMMER 2022; WINTER 2024)**

Answer:

- **Defines Product Requirements:** Customer needs establish the functional and performance specifications that the product must satisfy, ensuring the development effort is directed toward market-relevant features.
- **Reduces Failure Risk:** Understanding customer needs before development prevents costly redesigns and market rejection, significantly lowering the risk of product failure.
- **Drives Competitive Advantage:** Products that accurately address unmet or poorly served customer needs achieve higher customer satisfaction, loyalty, and market share.
- **Guides Resource Allocation:** Clear customer needs help prioritize development projects and allocate resources to features and products with the highest market value.
- **Enables Accurate Concept Selection:** Customer needs provide the criteria for evaluating and selecting among alternative product concepts during development.

- **Q.** Explain the articulated use methods for interviewing the customers, by taking suitable examples. **(SUMMER 2022, 4 Marks; SUMMER 2025)**

Answer:

Articulated use methods are interview techniques that focus on how customers actually use products, capturing tacit and unspoken needs.

- **Observation of Product Use:** The interviewer observes the customer using the product in their natural environment and asks questions about their actions.
- **Example:** Watching a customer use a kitchen appliance and asking, "Why do you hold the handle that way?"
- **Walkthrough of Use Sequence:** The customer demonstrates the step-by-step process of using the product while explaining each step.
- **Example:** A customer demonstrates how they clean a vacuum filter, revealing difficulty in removing the filter.
- **Talk-Aloud Protocol:** The customer verbalizes their thoughts while performing a task with the product, revealing frustrations and workarounds.
- **Example:** While using a mobile app, the customer says, "I can't find the settings menu—I always have to search for it."
- **Simulated Use / Role Play:** The customer is asked to imagine or simulate using the product in a specific scenario and describe their expected actions.
- **Example:** "Imagine you are packing for a trip—how would you use this suitcase?"
- **Lead-User Interviews:** Interviewing advanced users who have developed their own modifications or workarounds to identify latent needs.
- **Example:** Interviewing a professional photographer who has customized a camera bag to understand unmet storage needs.

- **Q.** Explain methods used to determine customer need importance. **(WINTER 2022 OR; SUMMER 2024)**

Answer:

Customer need importance is determined by assigning weights or priorities to each identified need based on its significance to customers.

Direct Rating / Point Allocation:

- Customers distribute a fixed number of points (e.g., 100) among a list of needs.
- Higher points indicate greater importance.
- Simple to administer but may lack discrimination among many needs.

Paired Comparison:

- Each need is compared with every other need in pairs.
- Customers indicate which need is more important in each pair.
- The number of times a need is preferred determines its relative importance.
- More reliable than direct rating but time-consuming for many needs.

Rank Ordering:

- Customers rank all identified needs from most important to least important.
- Provides a clear ordinal ranking but does not indicate the magnitude of difference between needs.

Constant Sum Scaling:

- Customers allocate a constant sum (e.g., 100 points) across needs to reflect relative importance.
- Allows finer discrimination than simple ranking.
- Requires careful instruction to ensure respondents understand the task.

Likert Scale Rating:

- Customers rate each need on a scale (e.g., 1 = not important, 5 = extremely important).
- Easy to administer and analyze.
- Subject to central tendency bias and scale interpretation differences.

Conjoint Analysis:

- Customers evaluate combinations of need attributes, and statistical analysis reveals the relative importance of each attribute.
- More complex but provides deeper insight into trade-offs.
- Useful when needs are interdependent.

Kano Model Classification:

- Needs are classified as Must-be, One-dimensional, Attractive, Indifferent, or Reverse based on customer responses to functional and dysfunctional questions.
- Identifies which needs are basic expectations versus delighters.
- Guides prioritization beyond simple importance ratings.

Customer Observation and Usage Data:

- Analyzing actual usage patterns, complaints, and workarounds to infer which needs are most critical.
- Complements survey-based methods with behavioral evidence.

- **Q.** Explain like-dislike method to conduct interview. **(SUMMER 2023, 3 Marks; SUMMER 2024 OR)**

Answer:

- **Like-Dislike Method:** An interview technique where customers are asked to express what they like and dislike about a product or product category, revealing both satisfied and unsatisfied needs.
- **Preparation:** Select a product or product category relevant to the development project. Prepare open-ended questions about specific features, usage experiences, and overall satisfaction.

- **Conducting the Interview:** Ask the customer to list aspects they like about the product and aspects they dislike. Probe each response with "Why?" to uncover underlying needs.
- **Example:** "What do you like about your current smartphone?" → "Battery life." → "Why?" → "Because I travel a lot and can't charge frequently."
- **Recording and Analysis:** Record both likes and dislikes verbatim. Group similar responses across multiple customers. Dislikes often reveal unmet needs and improvement opportunities, while likes indicate features to preserve or enhance.
- **Converting to Needs:** Translate each like/dislike statement into a specific customer need statement. Prioritize needs based on frequency and intensity of responses.

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2. Opportunity Identification and Concept Generation:

- **Q.** Explain opportunity identification process. **(SUMMER 2022, 7 Marks - appears as Q3(a) under the OR section; WINTER 2024)**

Answer:

Opportunity identification is the systematic process of discovering and evaluating potential product opportunities that align with market needs and organizational capabilities.

Diagram Description: A flow diagram showing: Market/Technology Scan → Opportunity Capture → Screening → Evaluation → Selection → Opportunity Development.

Establish a Charter and Scope:

- Define the strategic boundaries for opportunity search (e.g., target markets, technology domains, resource constraints).
- Specify the innovation strategy and goals of the organization.

Generate Opportunity Insights:

- **Collect information from diverse sources:** customer complaints, market trends, emerging technologies, competitor actions, supplier innovations, and internal R&D.
- Use methods such as customer interviews, focus groups, observation, patent analysis, and trend analysis.

Capture and Document Opportunities:

- **Record each opportunity in a structured format:** description, target customer, need addressed, potential value, and initial technical feasibility.
- Maintain an opportunity register or database for systematic tracking.

Screen Opportunities:

- Apply preliminary filters based on strategic fit, market size, technical feasibility, resource availability, and risk.
- Eliminate opportunities that clearly fall outside the charter or are not viable.

Evaluate and Prioritize Opportunities:

- **Conduct deeper analysis of shortlisted opportunities:** market potential, competitive landscape, technical risk, financial return, and alignment with core competencies.
- Use scoring models, financial analysis (NPV, ROI), and portfolio balancing techniques.

Select Opportunities for Development:

- Choose the most promising opportunities for further concept development.
- Consider portfolio balance across risk levels, time horizons, and market segments.

Develop Selected Opportunities:

- Allocate resources for concept development, market testing, and business case development.
- Transition selected opportunities into the formal product development process.

Review and Iterate:

- Periodically review the opportunity portfolio and update based on new information.
- Maintain a continuous opportunity identification process rather than a one-time event.

- **Q.** Discuss concept generation process. **(SUMMER 2022, 3 Marks; SUMMER 2026, 7 Marks)**

Answer:

Concept generation is the process of creating, developing, and communicating a broad set of product concepts from which the best concept will be selected.

Clarify the Problem:

- Understand the customer needs and target specifications.
- Decompose the problem into subproblems and identify critical functional requirements.
- Establish constraints and criteria for concept evaluation.

Search Externally:

- **Gather information from external sources:** lead users, experts, patents, literature, competitive products, and suppliers.
- Benchmark existing solutions and identify best practices.
- Explore analogous products from other industries for inspiration.

Search Internally:

- Generate concepts using internal team knowledge and creativity.
- Use idea generation methods such as brainstorming, brainwriting, and TRIZ.
- Encourage cross-functional participation and diverse perspectives.

Explore Systematically:

- Organize the search by decomposing the product into subsystems and components.
- Generate concepts for each subproblem systematically.
- Use morphological analysis to combine partial solutions into complete concepts.

Reflect on the Solutions and the Process:

- Review generated concepts for feasibility and novelty.
- Identify gaps in the concept set and generate additional concepts if needed.
- Document the process and rationale for future reference.

Organize and Communicate Concepts:

- Document each concept with sketches, descriptions, and key features.
- Use concept classification trees or affinity diagrams to organize concepts.
- Prepare concept descriptions for evaluation and selection.

Evaluate and Select Concepts:

- Apply screening and scoring methods to evaluate concepts against customer needs and technical criteria.
- Select the most promising concept(s) for further development.
- Test selected concepts with customers if necessary.

Iterate as Needed:

- If no satisfactory concept emerges, revisit the problem clarification and search steps.
- Concept generation is often iterative, with refinement based on feedback and new insights.

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3. Affinity Diagram:

- **Q.** Why are affinity diagrams used for product planning? **(WINTER 2022; SUMMER 2024, 3 Marks OR)**

Answer:

- **Affinity Diagram:** A tool used to organize large amounts of unstructured qualitative data (such as customer needs, ideas, or observations) into groups based on natural relationships or themes.

Reasons for use in product planning:

- **Organizes Complex Data:** Groups scattered customer needs, ideas, and observations into meaningful categories, making large datasets manageable and interpretable.
- **Reveals Patterns and Themes:** Identifies common themes and relationships among customer needs that may not be obvious from individual data points, highlighting priority areas.
- **Facilitates Cross-Functional Consensus:** Brings together team members from different functions to collectively organize data, building shared understanding of customer needs.
- **Supports Need Prioritization:** Once needs are grouped into affinity categories, teams can prioritize categories based on customer importance and strategic value.
- **Basis for Further Analysis:** The organized categories serve as input for concept generation, product specification, and opportunity evaluation.
- **Example Affinity Diagram Description:** For a kitchen knife product, customer statements are grouped into themes: Comfort (handle grip, weight balance), Sharpness (edge retention, ease of sharpening), Safety (non-slip handle, finger guard), Durability (rust resistance, blade material), and Aesthetics (design, color options). Each theme contains several specific customer need statements.

Other Important Questions:

1. Product Planning:

- **Q.** Justify the statement "Allocate Resources and Plan Timing plays significant role for product planning". **(WINTER 2025, 4 Marks)**

Answer:

- **Optimal Resource Utilization:** Allocating resources (personnel, budget, facilities) ensures that approved projects have the necessary means for successful execution, preventing delays due to resource shortages.
- **Portfolio Balance:** Resource allocation across multiple projects balances risk, market coverage, and time horizons, preventing over-concentration on a single project or market.
- **Timely Market Entry:** Planning timing determines project schedules and sequence, ensuring products reach the market when opportunities are most favorable and competitive advantage is maximized.
- **Dependency Management:** Timing plans account for interdependencies between projects (shared components, platforms, resources), avoiding conflicts and bottlenecks.
- **Capacity Planning:** Allocating resources and planning timing ensures that organizational capacity is not overcommitted, maintaining quality and preventing burnout of development teams.
- **Risk Mitigation:** Proper timing and resource planning identify potential bottlenecks and resource gaps early, allowing mitigation actions before they impact project success.

- **Q.** Explain the importance of elements in the product planning process. **(WINTER 2025, 7 Marks OR)**

Answer:

The key elements of product planning are identifying opportunities, evaluating and prioritizing projects, allocating resources and planning timing, and completing pre-project planning.

Identify Opportunities — Importance:

- Provides the foundation for all subsequent planning by discovering market gaps and customer needs.
- Ensures the organization pursues opportunities aligned with strategic goals and capabilities.
- Prevents investment in products with insufficient market demand.

Evaluate and Prioritize Projects — Importance:

- Ensures resources are directed to the most promising projects with the highest potential return.
- Balances the project portfolio across risk levels, time horizons, and markets.
- Provides objective criteria for project selection, reducing bias and emotional decision-making.

Allocate Resources and Plan Timing — Importance:

- Ensures approved projects have adequate personnel, budget, and facilities for execution.
- Prevents resource conflicts and bottlenecks by coordinating project schedules.
- Enables timely market entry and maximizes competitive advantage.

Complete Pre-Project Planning — Importance:

- Defines a clear product mission statement that guides the development team.
- Establishes project scope, objectives, and constraints, preventing scope creep.
- Assembles cross-functional teams and creates a formal project charter for accountability.

Integration of Elements — Importance:

- The elements form a coherent process where each stage informs and improves the next.
- Continuous feedback between elements enables adaptation to changing market conditions.
- The integrated process reduces uncertainty and improves the quality of product development decisions.

- **Q.** Explain the stepwise procedure of the product planning process. **(SUMMER 2025, 7 Marks OR)**

Answer:

Diagram Description: A cyclical process diagram showing four main stages: Identify Opportunities → Evaluate and Prioritize Projects → Allocate Resources and Plan Timing → Complete Pre-Project Planning, with feedback loops.

Identify Opportunities:

- Scan the market, technology landscape, and internal capabilities.
- Gather customer insights through interviews, surveys, and observation.
- Document potential opportunities with preliminary descriptions.
- Screen opportunities against strategic fit and resource constraints.

Evaluate and Prioritize Projects:

- Conduct market analysis (size, growth, competition).
- Assess technical feasibility and risk.
- Perform financial analysis (NPV, ROI, payback period).
- Apply scoring models and rank projects for prioritization.

Allocate Resources and Plan Timing:

- Assign budget, personnel, and facilities to approved projects.

- Develop project schedules and milestones.
- Balance the portfolio across risk, market, and time horizons.
- Manage dependencies and capacity constraints.

Complete Pre-Project Planning:

- Develop product mission statement (scope, target market, requirements).
- Form cross-functional project team.
- Create project charter with objectives, deliverables, and accountability.
- Conduct risk assessment and define mitigation strategies.

Review and Iterate:

- Periodically review the plan against actual progress and market changes.
- Update priorities, resource allocations, and timing as needed.
- Maintain continuous feedback between all stages.

- **Q.** Write short note on product planning. **(WINTER 2023, 7 Marks OR)**

Answer:

- **Product Planning:** Product planning is the ongoing process of determining what products to develop, when to develop them, and how resources should be allocated to achieve organizational objectives and market success.

Key Aspects:

- **Strategic Alignment:** Product planning ensures that product development efforts align with the organization's mission, vision, and strategic goals.
- **Opportunity Identification:** It systematically discovers market gaps, customer needs, and technological possibilities that can be converted into viable products.
- **Project Evaluation and Prioritization:** It evaluates potential projects based on market potential, technical feasibility, financial return, and strategic fit, then prioritizes them for resource allocation.
- **Resource Allocation:** It assigns personnel, budget, and facilities to approved projects, ensuring adequate means for successful execution.
- **Timing Planning:** It determines project schedules and sequence, ensuring timely market entry and coordination of interdependent activities.
- **Portfolio Management:** It balances the project portfolio across risk levels, market segments, and time horizons to achieve sustainable growth.
- **Pre-Project Planning:** It develops product mission statements, forms cross-functional teams, and creates project charters for accountability and direction.
- **Continuous Process:** Product planning is not a one-time activity but an ongoing process that adapts to market changes, new information, and organizational learning.

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2. Customer Needs:

- **Q.** Explain the common customer needs which should be known. **(WINTER 2025, 7 Marks)**

Answer:

Customer needs are the problems, desires, and requirements that customers expect a product to satisfy. Common categories of customer needs that should be known:

Functional Needs:

- What the product must do to perform its primary function.
- Performance requirements (speed, capacity, accuracy, power).
- Reliability and durability expectations.

- **Example:** A smartphone must make calls, run apps, and have sufficient battery life.

Usability Needs:

- Ease of use, learnability, and intuitiveness.
- Accessibility for diverse users (age, ability, language).
- Efficiency of use and error tolerance.
- **Example:** A TV remote should have clearly labeled buttons and simple navigation.

Emotional Needs:

- Feelings and emotional responses associated with product use.
- Aesthetics, style, and sensory appeal (look, feel, sound, smell).
- Status, identity, and self-expression.
- **Example:** A luxury watch conveys status and personal style.

Safety and Security Needs:

- Protection from harm, injury, or health risks.
- Data privacy and security of personal information.
- Environmental safety and compliance with regulations.
- **Example:** A car must have airbags, seatbelts, and crash protection.

Cost and Value Needs:

- Affordability and total cost of ownership.
- Perceived value for money.
- Operating costs (energy, maintenance, consumables).
- **Example:** A printer's total cost includes ink replacement, not just purchase price.

Social and Environmental Needs:

- Social acceptance and community approval.
- Environmental sustainability and ethical sourcing.
- Compliance with social norms and values.
- **Example:** Products with recyclable packaging appeal to environmentally conscious customers.

Service and Support Needs:

- Availability of after-sales service and support.
- Warranty, maintenance, and spare parts availability.
- Responsiveness to complaints and inquiries.
- **Example:** A washing machine brand with reliable service network.

Latent and Future Needs:

- Unspoken or unarticulated needs that customers may not express.
- Anticipated future needs based on trends and technology evolution.
- **Example:** Customers did not ask for smartphones before they existed, but latent needs for mobile information access existed.

- **Q.** Explain the different types of customer needs. **(SUMMER 2025, 4 Marks)**

Answer:

Type of Need	Description	Example
Functional Needs	What the product must do; performance and reliability requirements.	A car must provide safe, reliable transportation.
Emotional Needs	Feelings and aesthetic responses associated with the product.	A luxury car conveys status and prestige.
Usability Needs	Ease of use, learnability, and accessibility.	A smartphone with an intuitive interface.
Cost/Value Needs	Affordability and perceived value for money.	Budget-friendly products with good quality.
Safety/Security Needs	Protection from harm and data privacy.	Airbags and encryption in vehicles.
Social/Environmental Needs	Social acceptance and sustainability.	Eco-friendly packaging and ethical sourcing.

- **Q.** Which are the different types of customer needs? **(SUMMER 2023, 4 Marks)**

Answer:

Type of Need	Description	Example
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Social/Environmental Needs	Social acceptance and sustainability.	Eco-friendly packaging and ethical sourcing.

- **Q.** Describe the various methods used to determine customer need importance. **(WINTER 2024, 7 Marks OR)**

Answer:

Customer need importance is determined by assigning weights or priorities to each identified need based on its significance to customers.

Direct Rating / Point Allocation:

- Customers distribute a fixed number of points (e.g., 100) among a list of needs.
- Higher points indicate greater importance.
- Simple to administer but may lack discrimination among many needs.

Paired Comparison:

- Each need is compared with every other need in pairs.
- Customers indicate which need is more important in each pair.
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- More reliable than direct rating but time-consuming for many needs.

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Conjoint Analysis:

- Customers evaluate combinations of need attributes, and statistical analysis reveals the relative importance of each attribute.
- More complex but provides deeper insight into trade-offs.
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Kano Model Classification:

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Customer Observation and Usage Data:

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- Complements survey-based methods with behavioral evidence.

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3. Opportunities and New Ideas:

- **Q.** How to prioritise the opportunities? **(SUMMER 2024, 3 Marks)**

Answer:

- **Strategic Fit:** Evaluate how well the opportunity aligns with the organization's mission, vision, and core competencies.
- **Market Potential:** Assess market size, growth rate, customer demand, and willingness to pay. Opportunities with large and growing markets are prioritized.
- **Technical Feasibility:** Evaluate the technical complexity, availability of required technology, and development risk. Opportunities with lower technical risk are preferred.
- **Financial Return:** Estimate potential return on investment (ROI), net present value (NPV), and payback period. Prioritize opportunities with attractive financial returns.
- **Competitive Advantage:** Assess whether the opportunity provides a sustainable competitive advantage (unique technology, brand, cost position, or market access).
- **Resource Availability:** Consider the availability of required resources (personnel, budget, facilities, partnerships) and the opportunity's resource requirements.

- **Risk Assessment:** Evaluate market risk, technical risk, regulatory risk, and execution risk. Balance the portfolio across risk levels.
- **Scoring and Ranking:** Use a weighted scoring model combining multiple criteria to rank opportunities objectively. Select top-ranked opportunities for further development.

○ **Q.** Types of methods for generating new ideas. **(WINTER 2023, 3 Marks)**

Answer:

- **Brainstorming:** A group creativity technique where participants freely generate ideas without criticism, encouraging divergent thinking and quantity of ideas.
- **Brainwriting:** A silent, written version of brainstorming where participants write ideas on paper and pass them to others for further development, reducing social inhibition.
- **TRIZ (Theory of Inventive Problem Solving):** A systematic method based on analyzing patents and inventive principles to solve technical problems and generate innovative solutions.
- **Lead User Analysis:** Identifying and collaborating with advanced users who have unmet needs and have developed their own solutions, providing insights for new products.
- **Customer Observation and Ethnography:** Observing customers in their natural environment to identify unmet needs and usage problems that can inspire new product ideas.
- **Morphological Analysis:** Decomposing a product into dimensions and systematically exploring combinations of options to generate new product concepts.
- **SCAMPER Technique:** A checklist method using prompts: Substitute, Combine, Adapt, Modify, Put to other use, Eliminate, Rearrange/Reverse to generate new ideas.
- **Focus Groups and Crowdsourcing:** Gathering ideas from target customers through structured group discussions or open innovation platforms and idea competitions.

○ **Q.** Which are the different sources of new ideas? **(WINTER 2023, 3 Marks)**

Answer:

- **Customers:** Customer complaints, suggestions, unmet needs, and feedback provide direct insights for new product ideas.
- **Employees:** Sales staff, service technicians, and R&D personnel often identify opportunities from their direct experience with products and customers.
- **Competitors:** Analyzing competitor products, patents, and market moves can inspire new ideas and identify gaps.
- **Suppliers and Partners:** Suppliers of materials, components, and technology can provide ideas for new applications and innovations.
- **Research and Development:** Internal R&D activities, scientific research, and technology development generate new product possibilities.
- **Market Research and Trends:** Analysis of market trends, demographic shifts, and emerging customer preferences reveals new opportunities.
- **Universities and Research Institutions:** Academic research, publications, and collaborative projects can provide cutting-edge ideas.
- **Government and Regulatory Changes:** New regulations, standards, and government initiatives create needs for new products and services.

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4. Concept Development and Testing:

- **Q.** What is affinity diagram? Draw an affinity diagram with a suitable example. **(SUMMER 2022, 7 Marks)**

Answer:

Definition:

An affinity diagram is a tool used to organize large amounts of unstructured qualitative data (such as customer needs, ideas, or observations) into groups based on natural relationships or themes.

- **Purpose:** To identify patterns, themes, and relationships in complex data, facilitating understanding and prioritization of customer needs.

Procedure:

- **Generate Data:** Collect customer statements, needs, or ideas on individual sticky notes or cards.
- **Silent Sorting:** Team members silently group related notes without discussion, based on intuition and perceived similarity.
- **Discuss and Refine:** Discuss the groupings, resolve disagreements, and create clear category labels.
- **Label Categories:** Assign a descriptive name to each group that captures its central theme.

Example Affinity Diagram for a Coffee Shop:

Comfort & Ambience	Beverage Quality	Service Speed	Pricing	Food Options
Comfortable seating	Rich coffee taste	Quick order processing	Affordable prices	Variety of snacks
Good lighting	Consistent flavor	Short waiting time	Value for money	Healthy food choices
Quiet environment	Hot beverages served hot	Efficient staff	Discounts for regulars	Fresh pastries
Pleasant music	Customization options	Mobile ordering	Loyalty programs	Gluten-free options

Diagram Description: A tree diagram with the central theme "Coffee Shop Customer Needs" branching into five affinity categories: Comfort & Ambience, Beverage Quality, Service Speed, Pricing, and Food Options. Each category contains specific customer need statements.

- **Q.** Write and discuss the different survey formats in concept testing process with example. **(WINTER 2023, 7 Marks)**

Answer:

Concept testing involves presenting product concepts to potential customers to evaluate their reactions and purchase intent. Survey formats used include:

Verbal Description Survey:

- The concept is described in words (features, benefits, usage) and customers respond to questions.
- **Example:** "A new electric toothbrush with a pressure sensor that alerts you when brushing too hard. Would you buy this product?" (Yes/No/Maybe).
- **Advantage:** Quick and inexpensive; Limitation: Lacks visual appeal.

Storyboard Survey:

- A series of sketches or illustrations depicting the product in use, accompanied by a narrative.
- **Example:** A storyboard showing a person using a smart water bottle that tracks hydration and reminds them to drink.

- **Advantage:** Better visualization than text; Limitation: Requires artistic effort.

Video / Multimedia Survey:

- A short video demonstrating the product concept, its features, and benefits.
- **Example:** A video showing a robot vacuum cleaning a living room while the homeowner relaxes.
- **Advantage:** High realism and engagement; Limitation: More expensive to produce.

Physical Prototype Survey:

- A physical model or working prototype of the concept is presented for customer interaction.
- **Example:** A 3D-printed model of a new ergonomic mouse for users to hold and evaluate.
- **Advantage:** Provides tactile experience; Limitation: Costly and time-consuming.

Virtual / CAD Prototype Survey:

- A computer-generated 3D model or virtual reality simulation of the concept.
- **Example:** A VR walkthrough of a new kitchen appliance design, allowing users to interact with virtual controls.
- **Advantage:** Realistic without physical production; Limitation: Requires specialized software and skills.

Conjoint Analysis Survey:

- Customers evaluate combinations of product attributes to reveal preferences and trade-offs.
- **Example:** Presenting different combinations of smartphone features (camera quality, battery life, price) and asking customers to rank or choose.
- **Advantage:** Reveals attribute importance; Limitation: Complex to design and analyze.

Purchase Intent Survey:

- Customers indicate their likelihood of purchasing the product on a scale (e.g., definitely would buy, probably would buy, might buy, probably would not buy, definitely would not buy).
- **Example:** "How likely are you to purchase this product at $49.99?" (5-point scale).
- **Advantage:** Direct measure of market potential; Limitation: Stated intent may not match actual behavior.

- **Q.** Enlist the steps involved in concept selection process. **(SUMMER 2026, 3 Marks)**

Answer:

- **Prepare the Selection Matrix:** List the customer needs and design criteria; assign importance weights to each criterion.
- **Rate Each Concept:** Evaluate each concept against each criterion using a rating scale (e.g., 1–5) and calculate weighted scores.
- **Rank the Concepts:** Sum the weighted scores for each concept and rank them from highest to lowest.
- **Combine and Improve Concepts:** Identify strengths of different concepts and combine them into hybrid concepts; refine the best concepts.
- **Select the Final Concept:** Choose the concept(s) with the highest scores and best alignment with strategic objectives; proceed to further development.
- **Reflect on the Process:** Review the selection process for biases, gaps, and opportunities for improvement; document rationale for future reference.

- **Q.** Define the terms: (i) Function and worth (ii) Economic value and Aesthetic value. **(WINTER 2023, 4 Marks)**

Answer:

(i) Function and Worth:

- **Function:** The specific action or performance that a product or component is designed to accomplish. It describes what the product does (e.g., "transmit torque," "contain liquid").
- **Example:** The function of a car brake is to slow or stop the vehicle.
- **Worth:** The value or utility of a function to the customer, often expressed in monetary terms. It represents the maximum amount a customer is willing to pay for the function to be performed.
- **Example:** The worth of a brake system is high because it is essential for safety.

(ii) Economic Value and Aesthetic Value:

- **Economic Value:** The monetary benefit or cost savings that a product provides to the customer over its lifecycle, including purchase price, operating costs, maintenance, and resale value.
- **Example:** An energy-efficient refrigerator has high economic value due to lower electricity bills over time.
- **Aesthetic Value:** The visual, sensory, and emotional appeal of a product—its beauty, style, elegance, and ability to evoke positive feelings.
- **Example:** A designer watch has high aesthetic value due to its craftsmanship, materials, and visual appeal.
