CMR

INSTITUTE OF

TECHNOLOGY

VTU EXAM SOLUTION

Sub:	**Research Methodology and IPR/ II SEMESTER**	Code:	**MBA203**

Q.1 (a) What do you understand by research problem? Give example. (3 Marks)

A **research problem** is a specific issue, difficulty, contradiction, or gap in existing knowledge that a researcher aims to address through investigation. It is the foundational question that provides direction and focus to the entire research study.

A good research problem is *not* the same as the management dilemma (the symptom).

- **Management Dilemma (Symptom):** "Sales for our new software are 15% below target."
- **Research Problem (The 'Why'):** "To identify the factors influencing the low adoption rate of the new software and to determine the relative importance of these factors (e.g., price, features, user training, competitor actions)."

Q.1 (b) Explain features of a good research. (7 Marks)

A good research study is not accidental; it is characterized by several key features. For 7 marks, we must elaborate on these:

1. **Systematic and Logical:** Research follows a structured, sequential process. It begins with a problem, reviews existing work, sets objectives, collects and analyzes data, and draws logical conclusions. It is not haphazard.
2. **Objective:** Good research is free from all forms of personal bias. The findings and conclusions must be based purely on the data collected and its analysis, not on the researcher's opinions, emotions, or preconceived notions.
3. **Empirical:** It is grounded in observable, measurable evidence from the real world. Research relies on data collected through observation, experimentation, or surveys, rather than just on theory or speculation.
4. **Valid:** The research must measure what it claims to measure.
   - **Internal Validity:** Ensures that the observed effect (e.g., increase in sales) is truly due to the research variable (e.g., new ad campaign) and not some other extraneous factor.
   - **External Validity:** The extent to which the findings of the study can be generalized to other populations, settings, or times.
5. **Reliable:** The results must be consistent and repeatable. If another researcher were to conduct the same study under similar conditions, they should be able to achieve comparable results. This ensures the findings are stable and not just a one-time fluke.

6. **Replicable:** The research process must be documented in sufficient detail (e.g., sample size, methodology, analysis techniques) so that any other researcher can replicate the study to verify the findings.
7. **Ethical:** Good research adheres to a strict ethical code. This includes obtaining informed consent from participants, ensuring their confidentiality, protecting them from harm, and being transparent and honest in reporting the findings.

Q.1 (c) Explain in detail the research process with suitable examples. (10 Marks)

The research process is a multi-step, systematic framework for conducting a study.

Example Scenario: A national retail chain ("UrbanHome") observes that customer footfall in its physical stores has been steadily declining.

The Steps:

1. **Formulating the Research Problem:** The first step is to move from the management dilemma (declining footfall) to a clear research problem.
   - *Example:* "To identify the key drivers of decreased customer footfall at UrbanHome stores and to assess the impact of online competition and changing consumer preferences on in-store visits."
2. **Extensive Literature Review:** The researcher reviews existing academic papers, industry reports, and articles to understand what is already known about the topic.
   - *Example:* Reviewing studies on "showrooming" (customers viewing in-store, buying online), the rise of e-commerce in furniture, and the impact of in-store experience on retail.
3. **Developing Research Objectives & Hypotheses:** This step breaks the problem down into specific, testable goals.
   - *Example Objective:* "To measure current customer satisfaction with UrbanHome's in-store experience."
   - *Example Hypothesis (H1):* "A poor in-store experience (e.g., long checkout lines, poor service) is significantly and positively correlated with a customer's intention to shop online instead."
4. **Preparing the Research Design:** This is the "blueprint" of the study. It defines the *type* of research (e.g., exploratory, descriptive, causal), the data collection methods, and the sample design.
   - *Example:* A **descriptive research design** will be used, employing qualitative focus groups (exploratory) followed by a large-scale quantitative customer survey (descriptive).
5. **Determining the Sample Design:** This involves defining the target population, the sample frame (the list from which the sample is drawn), the sampling technique (e.g., random, stratified), and the sample size.
   - *Example: Population:* All customers who have shopped at UrbanHome in the last 12 months. *Sample:* 1,000 customers selected via *stratified random sampling* (to ensure all regions are represented) from the company's loyalty program database.
6. **Collecting the Data:** This is the execution phase, using the methods defined in the research design.
   - *Example:* Administering the online survey to the 1,000 selected customers. Simultaneously, conducting 5 focus groups with ex-customers to understand *why* they stopped visiting.
7. **Data Analysis and Interpretation:** The collected raw data is processed, cleaned, and analyzed.

- *Example:* Survey data is analyzed using SPSS. *Descriptive statistics* (mean, frequency) are run on all questions. *Inferential statistics* (e.g., regression analysis) are used to test the hypothesis (H1) and identify which factors (price, service, location, online convenience) most strongly predict the decline in footfall.

8. **Preparing and Presenting the Research Report:** The final step involves summarizing the entire process, the findings, and the conclusions into a formal report for management.
   - *Example:* A report is presented to UrbanHome's management, concluding that "While online competition is a factor, the primary driver of footfall decline is a perceived decrease in in-store service quality. We recommend a new employee training program."

Q.2 (a) Give a difference between exploratory and conclusive research design. (3 Marks)

The primary difference lies in their **objectives**. Exploratory research is used to gain initial insights and define a problem, while conclusive research is used to test specific hypotheses and support a final decision.

Feature	Exploratory Research	Conclusive Research
Objective	To explore a problem, gain insights, and generate hypotheses. (Vague problem)	To test specific hypotheses, examine relationships, and draw firm conclusions. (Clear problem)
Nature	Flexible, unstructured, qualitative. Uses small samples.	Formal, structured, quantitative. Uses large, representative samples.
Outcome	Tentative findings. "This *might* be the reason."	Definitive findings. "This *is* the reason."
Example	A focus group to understand *why* customers are unhappy.	A customer satisfaction survey to measure *how many* customers are unhappy with specific services.

Q.2 (b) Analyze and elaborate the conditions of choosing the cross-sectional and longitudinal studies in business research & justify. (7 Marks)

These are two primary time-based research designs. The choice depends entirely on the research objectives and required time frame.

1. Cross-Sectional Studies

- **What it is:** A "snapshot" of a population. Data is collected from a sample (or multiple samples) at **a single, specific point in time**.
- **Conditions for Choosing (Justification):**
  - **Objective is Prevalence:** When you need to know the *current* state of affairs.
    - *Justification:* If a company wants to know its *current* market share, the *current* level of employee satisfaction, or the *current* brand awareness, a cross-sectional study is perfect.

- **Time and Budget Constraints:** These studies are relatively fast and cost-effective to conduct.
  - *Justification:* Most business decisions require timely answers. A cross-sectional survey can be completed in weeks, whereas a longitudinal study takes months or years.
- **Example:** A survey conducted in *June 2025* to measure the brand preference for smartphones among MBA students. It tells us the preference *at that moment*.

2. Longitudinal Studies

- **What it is:** A "video" of a population. It involves tracking the *same* sample of respondents (a "panel") and collecting data from them **repeatedly over a period of time**.
- **Conditions for Choosing (Justification):**
- **Objective is Tracking Change:** When you need to understand *how* variables change over time.
  - *Justification:* If a company wants to measure the *impact* of a new advertising campaign, it must measure attitudes *before* the campaign (O1), during (O2), and *after* (O3). This is a longitudinal design.
- **Objective is Cause-and-Effect:** While correlation can be seen in cross-sectional data, tracking change over time provides stronger evidence of causality (e.g., did a price change *lead to* a change in brand loyalty?).
- **Understanding Trends and Behavior:** To study brand switching behavior, customer churn, or long-term employee morale, you must track the *same* people.
- **Example:** Tracking the *same* group of 1,000 new car buyers for 3 years to measure how their satisfaction and loyalty change as the car ages.

In summary: Choose **cross-sectional** for a fast, cost-effective "snapshot" of *what is*. Choose **longitudinal** for a slower, more expensive "video" to track *what is changing*.

Q.2 (c) Explain the application of research in marketing, finance, human resource and production & operations management. (10 Marks)

Business research is not a separate function; it is the decision-making tool for every functional area.

1. Applications in Marketing

Marketing research is the most common application. It links the consumer and the company.

- **Market Segmentation:** Research is used to identify and profile target customer segments based on demographics, psychographics, and behavior. (e.g., "Who are our 'heavy users'?").
- **Product Research:** Used for concept testing new product ideas, testing package designs, or identifying optimal product features.
- **Pricing Research:** Research (like conjoint analysis) is used to determine price elasticity and find the optimal price point that maximizes revenue.
- **Advertising Research:** Used to pre-test ad concepts before launch and post-test their effectiveness (measuring ad recall, brand-linkage, and impact on sales).

2. Applications in Finance

Financial research involves investigating financial markets, instruments, and corporate finance.

- **Investment Analysis & Valuation:** Researching company fundamentals (P/E ratio, cash flow), industry trends, and macroeconomic factors to determine a stock's "fair value" and issue a "buy" or "sell" rating.
- **Risk Management:** Using statistical models and research to assess a portfolio's exposure to market risk, credit risk, or operational risk.
- **Capital Budgeting:** When a firm considers a new factory, it researches the project's potential cash flows, payback period, and Net Present Value (NPV).

3. Applications in Human Resource (HR) Management

HR research focuses on optimizing the employee lifecycle and organizational effectiveness.

- **Employee Engagement & Satisfaction:** Conducting annual "climate surveys" to measure employee morale, identify drivers of disengagement, and reduce attrition.
- **Training Needs Analysis (TNA):** Researching skill gaps within the organization to design effective training and development programs.
- **Compensation and Benefits:** Conducting external benchmarking research to ensure the company's salary packages are competitive with the industry standard.

4. Applications in Production & Operations Management

This research focuses on efficiency, quality, and supply chain.

- **Quality Control:** Using statistical research methods (e.g., Six Sigma, Statistical Process Control charts) to monitor a production line, identify sources of variation, and reduce defects.
- **Supply Chain Optimization:** Researching and modeling different logistics networks, inventory strategies (e.g., Just-in-Time vs. EOQ), or new supplier viability to reduce costs and improve delivery times.
- **Facility Layout and Workflow:** Using simulation and observation research to design a factory floor or office layout that maximizes efficiency and minimizes bottlenecks.

Q.3 (a) What do you mean by sample & a sample frame? (3 Marks)

- **Sample:** A **sample** is a subset of elements (e.g., people, products, companies) selected from a larger group, known as the population. We study the sample to make inferences or generalizations about the entire population.
- **Sample Frame:** A **sample frame** is the specific list or source from which the sample is actually drawn. It is the operational representation of the target population.
  - *Example:* If your *population* is "All students at XYZ University," the *sample frame* would be "The official university registrar's list of all 10,000 enrolled students."
  - A frame can be imperfect (e.g., the list is outdated), which leads to *frame error*.

Q.3 (b) Explain sampling process with example. (7 Marks)

The sampling process is a structured procedure for selecting a subset of a population for a study.

Example Scenario: A company wants to survey its 5,000 employees, spread across three departments (Sales, IT, and Operations), to get feedback on a new health insurance policy. They decide to survey 500 employees.

The Steps:

1. **Define the Target Population:** This is the complete group of interest.
   - *Example:* All 5,000 full-time employees of the company.
2. **Determine the Sampling Frame:** This is the list from which the sample will be drawn.
   - *Example:* The internal HR database (payroll list) of all 5,000 employees.
3. **Select a Sampling Technique:** This is the method used to select the sample. We'll choose a probability method for accuracy.
   - *Example:* The company chooses **Stratified Random Sampling**. This is because they want to ensure employees from *all three* departments (the strata) are fairly represented.
4. **Determine the Sample Size:** Deciding *how many* units to select. This is often done using statistical formulas, but here it is given.
   - *Example: n = 500.*
5. **Execute the Sampling Plan:** This is the practical act of selecting the names.
   - *Example (Executing Stratified Sampling):*

1. **Divide the Frame:** The 5,000 employees are divided into their respective strata: Sales (1,000), IT (1,500), and Operations (2,500).
2. **Allocate the Sample:** The 500-person sample is allocated *proportionately* to each stratum.

- Sales: (1000 / 5000) * 500 = 100 employees
- IT: (1500 / 5000) * 500 = 150 employees
- Ops: (2500 / 5000) * 500 = 250 employees

3. **Draw the Sample:** A *simple random sample* (like a lottery) is drawn *within* each department to select the final 500 names.

Q.3 (c) Write your understanding on types of sampling design. (10 Marks)

Sampling designs are the methods used to select a sample from a population. They are broadly divided into two main categories: Probability and Non-Probability Sampling.

1. Probability Sampling

In this design, every unit in the population has a known, non-zero chance of being selected. This is the most robust method as it allows for statistical generalization of the findings to the whole population.

- **Simple Random Sampling (SRS):** The "lottery" method. Every member has an equal chance of being selected. *Example: Using a random number generator to pick 100 names from a list of 1,000.*
- **Systematic Sampling:** Selecting a random starting point and then picking every *k*-th element. *Example: Picking a random person from the first 10 on a list, and then selecting every 10th person after that (e.g., #7, #17, #27...).*
- **Stratified Sampling:** The population is divided into mutually exclusive groups (strata), such as age, gender, or department. A simple random sample is then drawn from *within each group*. This *guarantees* representation from all key subgroups.

- **Cluster Sampling:** The population is divided into clusters (e.g., cities, factory shifts). The researcher randomly *selects entire clusters* and then surveys *all* units (or a sample of units) within those selected clusters. This is useful when the population is geographically dispersed.

2. Non-Probability Sampling

In this design, the probability of any unit being selected is unknown. Selection is based on the researcher's convenience or judgment. It is faster and cheaper but cannot be statistically generalized to the population.

- **Convenience Sampling:** Selecting units that are easiest to reach. *Example: Interviewing shoppers at a single mall entrance, or surveying the first 50 people who respond to an email.*
- **Judgmental (or Purposive) Sampling:** The researcher uses their expert judgment to select units they believe are most representative of the population. *Example: A business journalist selecting 10 "typical" CEOs to interview about the economy.*
- **Quota Sampling:** The non-probability version of stratified sampling. The researcher creates quotas for subgroups (e.g., "Need 50 men and 50 women") but then fills those quotas using *convenience* or judgment, not random selection.
- **Snowball Sampling:** Used for rare or hard-to-find populations. The researcher finds one or two initial respondents and then asks them to *refer* other people who fit the criteria. *Example: Researching the behavior of "extreme coupon" users.*

Q.4 (a) What do you understand by data collection? (3 Marks)

Data collection is the **systematic process of gathering and measuring information** on variables of interest, as defined by the research problem and objectives. It is the "execution" phase of the research design.

This process involves two main types of data:

1. **Primary Data:** New, original data collected by the researcher for the specific purpose of the study (e.g., through surveys, interviews, or experiments).
2. **Secondary Data:** Existing data that was collected by someone else for a different purpose (e.g., government census data, company sales records, industry reports).

Q.4 (b) Analyze the methods of data collection with an example. (7 Marks)

This question primarily refers to *primary* data collection methods. The main methods are:

1. **Surveys (or Questionnaires):** This is the most common method. It involves collecting standardized data from a large sample by asking a pre-set list of questions.
   - *Modes:* Can be online (email, web), telephonic, mail-in, or face-to-face.
   - *Example:* A university sending a Google Form to 1,000 alumni to ask structured questions (e.g., "Rate your satisfaction with the career center on a scale of 1 to 5").
2. **Interviews:** This involves one-on-one (or small group) verbal conversation to gather data.
   - *Structured:* The interviewer asks the exact same questions in the same order (like a verbal survey).
   - *Unstructured (In-depth):* A flexible, conversational exploration of a topic.

- *Example:* An HR manager conducting 30-minute *semi-structured* exit interviews with employees who are leaving, to get detailed, qualitative insights into their reasons.

3. **Observation:** This involves systematically watching and recording behavior, events, or objects in their natural setting.
   - *Types:* Can be *participant* (researcher joins the group) or *non-participant* (researcher watches from outside); *overt* (people know they are being watched) or *covert* (they don't).
   - *Example:* A retail consultant acting as a "mystery shopper" to silently observe and record how many customers are greeted by staff within 10 seconds of entering a store.
4. **Focus Groups:** A moderated discussion with a small group of (typically 6-10) participants who share common characteristics. It is used to gather qualitative insights, opinions, and attitudes on a specific topic.
   - *Example:* A food company showing three new packaging designs to a group of mothers and listening to their discussion to see which design generates the most positive social response.
5. **(Optional) Experiments:** The researcher *manipulates* one variable (independent) to see its effect on another (dependent), while controlling all other variables.
   - *Example:* An e-commerce site showing 50% of users "Button A" (Green) and 50% of users "Button B" (Red) to see which one results in a higher "Add to Cart" conversion rate (A/B testing).

Q.4 (c) Explain in detail comparative and non-comparative scaling techniques. (10 Marks)

Scaling techniques are used in research (especially surveys) to measure abstract, non-numerical concepts like "attitude," "satisfaction," or "brand loyalty."

1. Comparative Scaling Techniques

In these techniques, the respondent is asked to compare one object, brand, or attribute directly against another. The data is often ordinal (rank-based).

- **Paired Comparison:** The respondent is shown *two objects at a time* and asked to select one based on a criterion.
  - *Example:* "Which do you prefer? [ ] Coke or [ ] Pepsi" ... "Which do you prefer? [ ] Coke or [ ] Sprite"... etc., for all possible pairs.
- **Rank Order:** The respondent is presented with *several objects simultaneously* and asked to rank them from best to worst.
  - *Example:* "Please rank the following smartphone brands from 1 (Most Preferred) to 4 (Least Preferred):"
    - __ Apple
    - __ Samsung
    - __ Google
    - __ OnePlus
- **Constant Sum:** The respondent is given a total number of points (e.g., 100) and asked to *allocate* them among different attributes based on their importance.
  - *Example:* "Please allocate 100 points among the following attributes of a laptop based on what is most important to you:"
    - __ Battery Life
    - __ Price

- __ Processing Speed
- __ Screen Quality
- **Total: 100**

2. Non-Comparative Scaling Techniques

In these techniques, the respondent evaluates only one object at a time. The evaluation is independent of other objects. This is the most common type of scaling.

- **Likert Scale:** (Most popular) The respondent indicates their level of *agreement or disagreement* with a series of statements.
  - *Example:* "Our customer service is responsive."
    - (1) Strongly Disagree
    - (2) Disagree
    - (3) Neutral
    - (4) Agree
    - (5) Strongly Agree
- **Semantic Differential Scale:** The respondent rates an object on a 7-point scale anchored by *bipolar adjectives* at each end.
  - *Example:* "Please rate UrbanHome's furniture:"
    - High Quality [ ] [ ] [ ] [ ] [ ] [ ] [ ] Low Quality
    - Modern [ ] [ ] [ ] [ ] [ ] [ ] [ ] Traditional
    - Expensive [ ] [ ] [ ] [ ] [ ] [ ] [ ] Inexpensive
- **Stapel Scale:** A unipolar (one adjective) 10-point scale ranging from -5 to +5 (without a neutral zero). It measures how accurately an adjective describes an object.
  - *Example:* "Please rate our mobile app on the following dimension. +5 means it describes it perfectly, -5 means it does not describe it at all."
    - +5
    - +4
    - +3
    - +2
    - +1
    - **[User Friendly]**
    - -1
    - -2
    - -3
    - -4
    - -5

Q.5 (a) What do you understand by editing and coding? (3 Marks)

Editing and coding are the initial, crucial steps in processing raw data to prepare it for analysis.

- **Editing:** This is the process of reviewing raw data (e.g., completed questionnaires) to check for and correct errors, inconsistencies, and omissions. The goal is to ensure the data is **accurate, complete, consistent, and legible.**
  - *Example:* Checking if a respondent selected "No" for "Do you own a car?" but then answered questions about their car's brand (an inconsistency).
- **Coding:** This is the process of assigning numerical codes or symbols to non-numerical (qualitative) responses. This is done to classify responses into categories so they can be entered into a computer and analyzed statistically.
  - *Example:* For the question "What is your gender?": Male = **1**, Female = **2**, Other = **3**.

Q.5 (b) Explain in detail steps involved in processing of data. (7 Marks)

Data processing transforms raw, unusable data into a "clean" dataset ready for analysis.

1. **Data Collection:** The prerequisite step where raw data is gathered (e.g., 500 completed surveys).
2. **Editing:** (As defined in 5a) The surveys are reviewed. This happens at two levels:
   - *Field Editing:* Done by the interviewer/collector to quickly check for major omissions on the same day.
   - *Central Editing:* Done by a supervisor at a central office, who checks all surveys for consistency and accuracy. (e.g., "Did respondent 'B' skip page 3?").
3. **Coding:** (As defined in 5a) A "codebook" is created that defines every variable (e.g., Q1, Q2) and the numerical codes for every possible answer (e.g., "Yes=1, No=2"). Open-ended questions (e.g., "What did you like best?") are also read and grouped into themes (e.g., "Service"=01, "Price"=02).
4. **Data Entry:** This is the physical (or digital) transcription of the coded responses from the questionnaires into a software program like an Excel spreadsheet or SPSS. Each *row* represents one respondent, and each *column* represents one variable (question).
5. **Data Cleaning (Validation):** This is a final computer-assisted check of the data file.
   - *Logical Checks:* Running queries to find impossible entries (e.g., a "5" in a column where the only codes are 1, 2, or 3).
   - *Outlier Checks:* Looking for extreme, nonsensical values (e.g., an 'Age' entry of "150" or an 'Income' entry of "$50 billion").
   - *Consistency Checks:* (e.g., "If Q5 (Age) is < 18, then Q6 (Do you vote?) must be 'No'.").
6. **Data Transformation (if needed):** Adjusting the data for analysis. This can involve *reverse-coding* (e.g., for a negative question like "The store was messy," flipping the 1-5 scale so '5' always means a positive response) or *collapsing categories* (e.g., grouping 50 different 'Age' entries into 5 clear "age brackets").

After these steps, the "clean dataset" is ready for statistical analysis.

Q.5 (c) Explain in detail types of research reports with neat structure. (10 Marks)

A research report is the formal document used to communicate the research process, findings, and recommendations to a specific audience. The two main types are the Technical Report and the Management Report.

1. The Technical Report (or Academic Report)

This is a comprehensive, detailed report written for an audience of researchers, academics, or clients who are interested in the methodological rigor of the study.

- **Structure:**

1. **Prefatory Pages:**

- Title Page
- Letter of Transmittal (from researcher to client)
- Letter of Authorization (from client to researcher)
- Table of Contents, List of Tables, List of Figures
- Executive Summary (a full, brief summary of the entire study)

2. **Main Body:**

- **Introduction:** Background of the problem, research objectives, and hypotheses.
- **Literature Review:** A detailed summary of existing research on the topic.
- **Research Methodology:** (The most detailed section) Research design, sampling design, data collection methods, and analytical procedures used. Full transparency is key.
- **Data Analysis and Findings:** The complete results, including all statistical tables, charts, and outputs.
- **Conclusions and Recommendations:** The researcher's interpretation of the findings and suggestions for future action or research.

3. **Appended Pages:**

- Questionnaires, interview guides
- Detailed statistical calculations (if not in the main body)
- Bibliography

2. The Management Report (or Popular Report)

This is a concise, action-oriented report written for decision-makers (e.g., executives, managers) who are not interested in the methodological details. They want to know "What did you find?" and "What should we do?"

- **Structure (Neat Structure emphasized):**

1. **Prefatory Pages:**

- Title Page
- Table of Contents

2. **Main Body:**

- **Executive Summary:** (THE MOST IMPORTANT PART). This is a 1-2 page summary of the *key* problem, findings, and recommendations. Many executives will *only* read this.
- **Introduction:** A brief statement of the business problem and the research objectives.
- **Key Findings & Conclusions:** The "so what?" of the data. This section is highly visual, using summary charts and graphs. All complex statistics are removed.
- **Recommendations:** Clear, concise, and *actionable* steps the management should take based on the findings.

3. **Appended Pages (Optional):**

- May include a brief overview of the methodology or key charts, but often it will simply reference the full "Technical Report" for those interested.

Q.6 (a) What is intellectual property? (3 Marks)

Intellectual Property (IP) refers to intangible creations of the human mind. Unlike physical property (like land or a car), IP is an idea, invention, expression, or design that has commercial value.

IP laws (like patents, copyrights, and trademarks) grant the creator **exclusive rights** to use, profit from, and control their creation for a limited period, allowing them to benefit from their work and encouraging innovation.

Q.6 (b) Explain the different types of intellectual property. (7 Marks)

There are several major types of IP, each protecting a different kind of creation:

1. **Patents:** A patent protects **inventions**. It grants the inventor an exclusive right (usually 20 years) to make, use, or sell a *new, useful, and non-obvious* process, machine, or composition of matter.
   - *Example:* The specific chemical formula for a new pharmaceutical drug or a new mechanical process for manufacturing a microchip.
2. **Copyrights:** A copyright protects **original works of authorship** that are "fixed in a tangible medium." This includes literary, artistic, musical, and dramatic works. It protects the *expression* of an idea, not the idea itself.
   - *Example:* The text of a novel, the code of a software program, a photograph, a song's melody and lyrics.
3. **Trademarks:** A trademark protects **brand identity**. It is a sign, design, logo, name, or slogan that identifies and distinguishes the *source* of goods or services of one party from those of others.
   - *Example:* The Nike "swoosh" logo, the name "Coca-Cola," or the sound of the Intel chime.
4. **Trade Secrets:** A trade secret is **confidential business information** that provides a company with a competitive edge. It is protected *without registration* as long as the company takes reasonable steps to keep it secret.
   - *Example:* The formula for Coca-Cola, Google's search algorithm, or a proprietary client list.
5. **Geographical Indications (GIs):** A GI is a sign used on products that have a specific geographical origin and possess qualities or a reputation that are due to that origin.
   - *Example:* "Darjeeling Tea" (can only come from Darjeeling) or "Champagne" (can only come from the Champagne region of France).

Q.6 (c) Elaborate your understanding on trade related investment measurement and its features. (10 Marks)

*(Note: The term is **Trade-Related Investment Measures (TRIMs)**, not "measurement." This answer will address TRIMs as it is the standard concept in this field.)*

Understanding TRIMs:

The Agreement on Trade-Related Investment Measures (TRIMs) is one of the foundational agreements of the World Trade Organization (WTO).

It addresses the fact that many countries, in an effort to attract foreign direct investment (FDI), impose certain *conditions* or *measures* on foreign investors. The WTO recognized that some of these measures can distort or restrict international trade, and therefore created the TRIMs agreement to regulate them.

The TRIMs agreement does *not* regulate all investment measures, only those that are "trade-related" and violate basic WTO principles.

Key Features and Prohibited Measures:

The core feature of the TRIMs agreement is its **prohibition** of any measure that violates two key principles of the General Agreement on Tariffs and Trade (GATT):

1. **National Treatment (GATT Article III):** This principle states that a country cannot treat foreign goods *less* favorably than its own domestic goods.
2. **Quantitative Restrictions (GATT Article XI):** This principle prohibits a country from imposing quotas or bans on imports or exports.

Based on this, the TRIMs agreement features an "illustrative list" of measures that are explicitly prohibited:

- **Local Content Requirements:**
  - *What it is:* A rule requiring a foreign investor (e.g., a car company) to purchase or use a certain amount of *locally-made* inputs (e.g., "60% of your steel must be sourced domestically").
  - *Why prohibited:* It violates "National Treatment" because it discriminates *against* foreign-made steel in favor of domestic steel.
- **Trade Balancing Requirements:**
  - *What it is:* A rule requiring a company to "balance" its imports with its exports. For example, the company is only allowed to import raw materials equal to the value of the finished goods it exports.
  - *Why prohibited:* It violates "Quantitative Restrictions" by limiting a company's ability to import freely.
- **Foreign Exchange Balancing Requirements:**
  - *What it is:* A rule that limits a company's access to foreign exchange (which is needed to pay for imports) to an amount related to its foreign exchange earnings (from its exports).
  - *Why prohibited:* This also acts as a "Quantitative Restriction" on imports.

Other Features:

- **Notification:** WTO members must notify the WTO of all TRIMs they are using.
- **Transition Periods:** The agreement provided transition periods (longer for developing countries) to eliminate their prohibited TRIMs.
- **Goods, not Services:** The TRIMs agreement applies only to investment measures affecting trade in *goods*.

Q.7 (a) Explain the errors affecting research design. (3 Marks)

The primary goal of a research design is to minimize **Total Error**, which is the difference between the true population value and the value observed in the research. Total Error is composed of two types:

1. **Random Sampling Error:** This is the error that occurs by chance simply because we are surveying a *sample* instead of the entire population. It is unavoidable but can be estimated and reduced by *increasing the sample size*.
2. **Non-Sampling Error (Systematic Bias):** This is the more dangerous error, as it stems from flaws in the research design or execution. It is *not* fixed by increasing the sample size. Key types include:
   - **Respondent Error:** (e.g., *Non-response bias* where people who don't answer are different from those who do; or *Response bias* where respondents lie or misunderstand).
   - **Researcher Error:** (e.g., *Measurement error* from a confusing question; *Data analysis error*).

Q.7 (b) Analyze the Qualitative research techniques with examples. (7 Marks)

Qualitative research is used to gain a deep, nuanced understanding of *why* people think, feel, or behave the way they do. It is exploratory and uses non-numerical data.

1. **In-depth Interviews (IDIs):** A one-on-one, semi-structured conversation where the researcher asks open-ended questions to explore a topic in detail.
   - *Analysis:* The interview transcripts are "coded" to find recurring themes.
   - *Example:* Interviewing 15 recent homebuyers to understand their *emotional journey*, fears, and moments of delight during the purchase process.
2. **Focus Groups:** A moderated discussion with a small group (6-10) of participants from the target audience. The key is observing the *group dynamic* and how participants build on each other's ideas.
   - *Analysis:* Observing consensus, disagreements, and shared language.
   - *Example:* A TV network showing a new show pilot to a group of teenagers and listening to them debate what they liked and disliked.
3. **Ethnography (and Observation):** The researcher immerses themselves in the participant's natural environment to observe their "real world" behavior, culture, and context.
   - *Analysis:* Taking detailed field notes to understand rituals and unspoken rules.
   - *Example:* A researcher "shadowing" a surgeon for a week to understand the workflow challenges and pain points of using a new medical device in a real operating room.
4. **Case Study Research:** An intensive, in-depth investigation of a single unit (e.g., a person, a company, an event). It uses multiple data sources (interviews, documents, observation).
   - *Analysis:* Triangulating all data sources to build a holistic narrative.
   - *Example:* A detailed study of a *single* successful product launch (like the first iPhone) to identify the critical success factors.
5. **Projective Techniques:** (Often used within interviews) These are indirect, ambiguous tasks used to make respondents "project" their underlying, subconscious attitudes.
   - *Analysis:* Interpreting the responses symbolically.
   - *Example:* "If Brand X (a bank) were an animal, what would it be and why?" (Answers like "a snail" or "a shark" are very revealing).

Q.7 (c) Analyze the different types of experimental research design. (10 Marks)

Experimental designs are used to test for **cause-and-effect** relationships by manipulating an *Independent Variable* (IV) to see its effect on a *Dependent Variable* (DV).

Notation: X = Treatment (IV), O = Observation (DV), R = Random Assignment

1. Pre-Experimental Designs (Weakest)

These designs lack randomization and often a control group, making them vulnerable to many errors (e.g., history, maturation).

- **One-Shot Case Study (X O):** A single group is exposed to a treatment (X) and then measured once (O).
  - *Example:* Show a class an ad (X) and then measure their purchase intent (O).
  - *Flaw:* You have no baseline. How can you be sure the ad *caused* the intent?
- **One-Group Pre-test Post-test (O1 X O2):** A group is measured (O1), exposed to the treatment (X), and measured again (O2).
  - *Example:* Measure employee morale (O1), implement a "flex-time" policy (X), and measure morale again (O2).
  - *Flaw:* Better, but if morale improved, was it the policy (X) or was it because the company just won a big contract (an outside *history* event)?

2. True Experimental Designs (Strongest)

These are the "gold standard" because they use random assignment to create equivalent "Experimental" and "Control" groups, which rules out most alternative explanations.

- **Pre-test Post-test Control Group:**
  - Experimental Group: R O1 X O2
  - Control Group: R O3 O4
  - *Example:* Randomly assign 100 people into two groups. Measure both groups' attitudes toward a brand (O1, O3). Show *only* the experimental group the ad (X). Measure both groups again (O2, O4).
  - *The true effect of the ad = (O2 - O1) - (O4 - O3).*
- **Post-test Only Control Group:**
  - Experimental Group: R X O1
  - Control Group: R O2
  - *Example:* Randomly assign users to two versions of a website. One group sees the new design (X), the other sees the old one (control). Measure the conversion rate (O1, O2) for both.
  - *This design is used when a pre-test (O1) might "prime" or bias the respondents.*

3. Quasi-Experimental Designs

These are used when random assignment (R) is not possible or practical (e.g., in real-world settings). The researcher must use existing, non-equivalent groups.

- **Time Series Design (O1 O2 O3 X O4 O5 O6):** Multiple measurements are taken *before* and *after* a treatment (X) is introduced.
  - *Example:* Track a store's sales for 3 months (O1, O2, O3), then run a new pricing strategy (X), and track sales for 3 more months (O4, O5, O6). This helps you see if the change broke an existing trend.
- **Nonequivalent Control Group Design (O1 X O2 / O3 O4):** The researcher uses two "intact" or "natural" groups (e.g., two different factory shifts, two different cities) that are *not* randomly assigned. One gets the treatment, one doesn't.
  - *Flaw:* The groups might have been different from the start, but it's often the best you can do in a field setting.

Q.8 (Compulsory Case Study) (Total 20 Marks)

Q.8 (a) Evaluate the problem definition. Has the problem been defined adequately? (10 Marks)

Evaluation: The research problem definition is **largely adequate and very well-focused**, though it could be slightly refined for *actionability*.

Strengths (Why it is Adequate):

1. **Correct Distinction:** The task force has successfully distinguished between the **Management Decision Problem** and the **Marketing Research Problem**.
   - *Management Problem:* "We are committed to implementing an inter-regional ETC system." (This is a "what to do" decision, which is already made).
   - *Research Problem:* "To identify the ideal configuration of service attributes... and determine how similar or different these configurations might be across agencies." (This is an "information needed" problem).
2. **Avoided the Wrong Question:** The task force correctly identified that "demand projection" (a "whether to" question) was *not* their principal role. This saved a significant amount of time and resources by focusing the research on what was actually needed.
3. **Clear Scope:** The problem is clearly scoped. It is *inter-regional* (not agency by agency), and it is focused on *commuter preferences* for *service configuration*.
4. **Variables Identified:** The task force has already completed a significant part of the *exploratory research* by culling a "lengthy list" down to 7 specific attributes (accounts, payment, lanes, transferability, price, toll discount, other uses). This is a very strong foundation.

Weaknesses (How it could be improved):

1. **Lacks Prioritization:** The problem is "to identify the ideal configuration," but it doesn't explicitly state the need to understand the *trade-offs* or *relative importance* of the 7 attributes. For example, is a 25% toll discount *more important* than tag transferability? An "ideal" configuration might be a $0 tag with every feature, which is not financially feasible.
2. **Lacks Actionable Objective:** A slightly better definition would be: "To determine the *optimal bundle* of service attributes that will *maximize commuter adoption and satisfaction*, while operating within given cost constraints, and to identify distinct commuter *segments* based on these preferences."

Conclusion:

Yes, the problem has been defined adequately. It has successfully moved past the symptoms (traffic jams) and the management decision (implementation) to identify the precise, solvable research question: "What do our customers want the service to look like?"

Q.8 (b) What type of research design would you recommend for this project? (10 Marks)

The objective is to find the "ideal configuration" and understand how commuters *trade-off* 7 different attributes. This requires a specific and sophisticated research design.

1. Overall Research Design: Conclusive, Descriptive Research

The team is past the Exploratory phase (they already have the 7 attributes). They now need to describe the market's preferences and test relationships between attributes and commuter choice. Therefore, a Conclusive-Descriptive design is required.

2. Data Collection Method: Cross-Sectional Survey

A large-scale quantitative survey should be administered one-time (cross-sectionally) to a large, representative sample of commuters from all 7 agency regions.

3. Specific Analytical Technique: Conjoint Analysis

This is the most critical recommendation. A simple "rate the importance of..." Likert scale survey will fail because commuters will rate everything (low price, all features) as "Very Important."

The research problem requires **Conjoint Analysis**.

- **What it is:** Conjoint Analysis is a multivariate statistical technique specifically designed to measure how people *value* the different *components* (attributes) of a product or service.
- **How it Works (Justification):**

1. Instead of asking "Is tag price important?", the survey would present respondents with realistic *profiles* or *packages* of the ETC service and force them to *choose* their preferred one.
2. Example Choice Card:

	Plan A	Plan B
Tag Price	$10 (one-time)	$0 (Free)
Toll Discount	15% off cash price	5% off cash price
Transferable?	Yes, to any car	No, one tag per car

- **I would choose: [ ] Plan A [ ] Plan B [ ] Neither**

3. By presenting respondents with a series of these trade-off scenarios, the researchers can *statistically deduce* the "utility" or *relative importance* of each individual attribute.

- **Outcomes of this Design:**

1. It will directly identify the **"ideal configuration"** (the bundle of attributes that yields the highest combined utility).
2. It will calculate the *relative importance* of each attribute (e.g., "Commuters value a 10% toll discount *twice as much as* they value tag transferability").
3. By running segmentation analysis on the results, it will perfectly answer the second part of the problem: "how similar or different these configurations might be across agencies" (e.g., "Agency A commuters are highly price-sensitive, while Agency B commuters prioritize 'other uses' like airport parking").