

## **Objective Function:**

The objective function is a mathematical equation that describes the production output target that corresponds to the maximization of profits with respect to production. ... It then uses the correlation of variables to determine the value of the final outcome.

The objective function can take the form of  $z = f(x_i)$

## **Question No.02**

### **Problem formulation**

The problem formulation is the heart (or core) of your thesis to which you should always return if you lose track during your further research and writing process.

### **Formulating your research problem with ease**

Formulating your research problem enables you to make a purpose of your study clear to yourself and target readers. Focus your paper on providing relevant data to address it. A problem statement is an effective and essential tool to keep you on track with research and evaluate it. How can you formulate a powerful research problem? Consider 5 ways to formulate the research problem:

- Specify your research objectives;
- Review its context or environment;
- Explore its nature;
- Determine variable relationships;
- Anticipate the possible consequences of alternative approaches.

### **Specific research objectives**

A clear statement that defines all objectives can help you conduct and develop effective and meaningful research. They should be manageable to bring you success. A few goals will help you keep your study relevant. This statement also helps professors evaluation the questions your research project answers and different methods that you use to address them.

### **Review the context of your research problem**

It's necessary to work hard to define and test all kinds of environmental variables to make your project successful. Why do you need to do that? This step can help you define if the important findings of your study will deliver enough data to be worth considering. Identify specific environmental variables that may potentially affect your research and start formulating effective methods to control all of them.

## **Explore the nature of your research problem**

Research problems may range from simple to complex, and everything depends on a range of variables and their relationships. Some of them can be directly relevant to specific research questions, while others are completely unimportant for your project.

Why should you understand their nature? This knowledge enables you to develop effective solutions. To get a deep understanding of all dimensions, think about focus groups and other relevant details to provide the necessary insight into a particular question.

## **Determine variable relationships**

Scientific, social, and other studies often focus on creating a certain sequence of repeating behaviors over time. What does your project entail? Completing the entire process involves:

- Identifying the variables that affect possible solutions to your research problem;
- Deciding on the degree to which you can use and control all of them for study purposes;
- Determining functional relationships between existing variables;
- Choose the most critical variables for a solution of your research problem.

## **Consequences of alternative approaches**

There are different consequences that each course of action or approach can bring, and that's why you need to anticipate them. Why communicate possible outcomes? It's a primary goal of any research process.

## **Question No.03**

### **Part(A)**

#### **Deterministic models**

In deterministic models, the output of the model is fully determined by the parameter values and the initial conditions initial conditions.

Demographic stochasticity describes the randomness that results from the inherently discrete nature of individuals. It has the largest impact on small individuals. It has the largest impact on small populations.

Demographic stochasticity has its biggest impact on small populations

## **Stochastic models**

Stochastic models possess some inherent randomness. The same set of parameter values and initial conditions will lead to an ensemble of different outputs.

Environmental stochasticity describes the randomness resulting from any change that impacts an entire population (such as changes in the environment). Its impact doesn't diminish as populations become large.

Stochastic models, brief mathematical considerations

- There are many different ways to add stochasticity to the same deterministic skeleton.
- Stochastic models in continuous time are hard.
- Gotelli provides a few results that are specific to one way of adding stochasticity.

## **Part (B)**

### **Operations research:**

Operations research (OR) is an analytical method of problem-solving and decision-making that is useful in the management of organizations. In operations research, problems are broken down into basic components and then solved in defined steps by mathematical analysis.

### **Optimal solution**

An optimal solution is a feasible solution where the objective function reaches its maximum (or minimum) value – for example, the most profit or the least cost. A globally optimal solution is one where there are no other feasible solutions with better objective function values.

**Model:**

A representation of an actual object or situation .It shows the relationship and inter relationship of action and reaction in terms of cause and effect.