

Plot No. 2, Knowledge Park-III, Greater Noida (U.P.) –201306

POST GRADUATE DIPLOMA IN MANAGEMENT (2025-27)
MID TERM EXAMINATION (TERM -III)

Subject Name: **Data Modelling**

Time: **30 Mins (for Hands-on)**

Sub. Code: **PGIT33**

Max Marks: **20 (Hands-on (10) + viva (10))**

Note: All questions are compulsory. Read the questions and answer the questions on Excel file.

Kindly write the all the course outcomes as per your TLEP in the box given below:

CO1- Apply spreadsheet-based data modelling techniques to structure business problems and perform what-if analysis. (L3)
CO2- Analyze business decision problems using linear programming models and interpret optimization results. (L4)
CO3- Analyze integer and nonlinear optimization models to evaluate alternative business decision scenarios. (L4)
CO4- Evaluate prescriptive network models to optimize logistical efficiency and resource allocation in complex business environments. (L5)
CO5- Evaluate business decisions under uncertainty using Monte Carlo simulation and decision tree modelling. (L5)

Q1. Bill Pritchett's Shop operates with a specific financial structure where the selling price per unit is \$10.00, fixed costs are \$1,000.00, and variable costs are \$5.00 per unit. Using the provided spreadsheet model, formulate the mathematical functions for Total Cost and Profit relative to the number of units sold. Identify the specific break-even point. Furthermore, perform a sensitivity analysis to evaluate a potential marketing strategy that would increase fixed costs to \$1,500.00 while allowing for a price hike to \$12.00. Determine whether this shift increases or decreases the break-even point and calculate the net change in profit if the shop sells 1,000 units. **(5 Marks)**

Known Parameters

Selling price per unit
 Fixed cost
 Variable cost per unit

Variables

Number of units

Results

Total revenue	
Fixed cost	
Total variable cost	
Total cost	
Profit	

Q2. Apex Electronics manufactures two types of high-end data processing units: the Model Alpha and the Model Beta. Each Model Alpha generates a profit of \$150, while each Model Beta generates a profit of \$100. The production process is constrained by two critical resources: assembly labor and specialized testing hours. To produce one Model Alpha, it takes 4 hours of assembly and 2 hours of testing. In contrast, a Model Beta requires 2 hours of assembly and 3 hours of testing. For the upcoming production cycle, the facility has a maximum of 100 hours of assembly time and 90 hours of testing time available. Furthermore, marketing research suggests that the total demand for both

models combined should not exceed 40 units to avoid overstocking. Define the decision variables, formulate the linear objective function to maximize total profit, and establish the system of linear inequalities representing the constraints. Determine the optimal product mix that maximizes profit and identify which resources, if any, are "binding" (completely used up) versus those that have "slack" (leftover capacity). **(5 Marks)**

Kindly fill the total marks allocated to each CO's in the table below:

COs	Blooms Taxonomy Levels	Marks Allocated
CO1	L3	10 Marks
CO2	L4	10 Marks

Blooms Taxonomy Levels given below for your ready reference:

L1= Remembering

L2= Understanding

L3= Apply

L4= Analyze

L5= Evaluate

L6= Create