Roll No……

GL BAJAJ Institute of Management & Research Greater Noida

FIND YOUR SPARK

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

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

Subject Name: **Data Modelling** Time: **01:30 Hrs**

Sub. Code: **PGIT33** Max Marks: **40**

Note: All questions are compulsory. Section A carries 12 marks: 6 questions of 2 marks each, Section B carries 18 marks having 3 questions (with internal choice question in each) of 6 marks each and Section C carries 10 marks one Case Study having 2 questions of 5 marks each.

Instruction:

1. All questions are to be solved using MS-Excel on an individual Computer.

2. EACH AND EVERY QUESTION NEEDS TO BE SOLVED ON THE DEFINED INDIVIDUAL WORKSHEETSHEET. Each sheet is renamed with the Question numbers.

3. Student are supposed to save the file using his/her full name and Admission No/Roll Number and section: example (Name_Admission No._Section).

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

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

SECTION - A

Attempt all questions. All questions are compulsory. **2×6 = 12 Marks**

Questions	CO	Bloom's Level
Q. 1: (A). A sales dataset contains daily sales values for 30 days. Use Excel functions to calculate the average sales and highest sales value. You can assume the values. **Q. 1: (B).** A marks dataset contains the following values: 45, 48, 50, 52, 55, 95. Use Excel to identify the value that may be an outlier**,** give the reson for the same. **Q. 1: (C).** A shop sells a product for ₹500 per unit. In Excel, create a one-variable Data Table to show total revenue when quantity sold changes from 10 to 50 units. **Q. 1: (D).** What does allowable increase or allowable decrease mean in a Solver	CO1	L3

sensitivity report?

Q. 1: (E). Give one real-life example of a minimization problem in linear programming. | CO2 | L4

Q. 1:(F). If the shadow price of a resource is zero, what does it usually indicate?

SECTION – B

All questions are compulsory (Each question has an internal choice. Attempt anyone (either A or B) from the internal choice) **6 x 3 = 18 Marks**

Questions	CO	Bloom's Level

Q. 2: (A). For inventory problems, the cost is a function of the order size. A company has collected the following data for one of its product. Annual requirement, R = 12,000 Ordering cost per order, S = 150 Cost per unit, C = 4 Carrying cost per unit, I = 0.20 Quantity ordered per order, Q = 100 Develop a spreadsheet model for computing ordering cost, carrying cost, and total cost functions. | CO3 | L4

Or

Q. 2: (B). A company evaluates the quarterly performance of its customer service executives using two components: six weekly service-quality reports, each worth 20 points, and two major customer-satisfaction audits, each worth 100 points. Currently, the company calculates the final performance score by giving 80 percent weight to customer-satisfaction audits and 20 percent weight to weekly service-quality reports. Set up a spreadsheet to calculate the final performance score for a customer service executive that allows the manager to change the weight given to customer-satisfaction audits.

Q. 3: (A). A computer-manufacturing plant produces mice, keyboards, and video-game joysticks. The per-unit profit, per-unit labor usage, monthly demand, and per-unit machine-time usage are given in the following table: | CO3 | L4

	Mice	Keyboards	Joysticks
Profit/unit	$8	$11	$9
Labor usage/unit	.2 hour	.3 hour	.24 hour
Machine time/unit	.04 hour	.055 hour	.04 hour
Monthly demand	15,000	29,000	11,000

Each month, a total of 13,000 labor hours and 3,000 hours of machine time are available. How can the manufacturer maximize its monthly profit contribution from the plant?

Or

Q. 3: (B). Shoeco manufactures three types of shoes. Demand for shoes is unlimited and 40 hours per week of machine time and labor are available. A pair of shoes yields the following profit and uses the number of minutes of machine time and labor given in the table below. Assuming the number of pairs of shoes made each week must be an integer, how can Shoeco maximize weekly profit?

	Shoe 1	Shoe 2	Shoe 3
Profit	$40	$25	$30
Minutes labor used	40	20	30
Minutes machine time used	45	25	26

Q. 4: (A). A small bakery is trying to determine how many boxes of fresh cupcakes it should prepare each day. The owner believes the daily demand for cupcake boxes is governed by the following discrete random variable:

Demand	Probability
20	0.10
25	0.20
30	0.30
35	0.25
40	0.15

The bakery spends $1.00 to prepare each box of cupcakes and sells each box for $1.95. Any unsold cupcake box can be sold at the end of the day at a discounted price of $0.50**.** How many boxes of cupcakes should the bakery prepare each day? **Or** **Q. 4: (B).** A mobile phone retailer believes that the demand for a newly launched smartphone model will be normally distributed with a mean of 500 units and a standard deviation of 80 units**.** The retailer's cost of purchasing one smartphone from the manufacturer is ₹22,000**,** and each smartphone is sold for ₹35,000**.** Half of all smartphones not sold at the regular price can be sold later during a clearance sale at a discounted price of ₹26,000**.** The retailer is considering ordering 450, 500, 550, 600, 650, or 700 smartphones. How many smartphones should the retailer order?	CO4	L5

SECTION - C

Read the case and answer the questions **5×02 = 10 Marks**

Questions	**CO**	**Bloom's Level**
Q. 5: Case Study: An airline operates a telephone reservation center to handle customer calls related to ticket bookings, cancellations, flight changes, and general travel enquiries. Since call volume varies during the day, the airline needs to decide how many telephone reservation operators should be scheduled for different shifts. The number of telephone reservation operators needed by an airline during each time of day is shown in the following table. Each operator works one of the following six-hour shifts: midnight–6:00 AM, 6:00 AM–noon, noon–6:00 PM, and 6:00 PM–midnight. The airline wants to ensure that enough operators are available in every time period while keeping the total number of operators as low as possible.	CO5	L5

Time	**Operators needed**
Midnight–4 AM	12
4 AM–8 AM	16
8 AM–noon	22
Noon–4 PM	30
4 PM–8 PM	31
8 PM–midnight	22

Q. 5: (A). Formulate the problem as an integer linear programming model to minimize the total number of telephone reservation operators required.

Q. 5: (B). Solve the model using Excel Solver and determine the minimum number of operators needed, along with the number of operators assigned to each six-hour shift.

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

COs	**Marks Allocated**	**Questions**
CO1	6	1 (A,B,C)
CO2	6	1 (D,E,F)
CO3	12	3
CO4	6	4
CO5	10	5

(Please ensure the conformity of the CO wise marks allocation as per your TLEP.)