

# JAIPURIA INSTITUTE OF MANAGEMENT, NOIDA

# PGDM / PGDM (M) / PGDM (SM)

# 2<sup>nd</sup> TRIMESTER (Batch 2016-18)

## MID TERM EXAMINATIONS

Course Name	Quantitative Analysis for Management- II	Course Code	OP 201
Max. Time	One Hour	Max. Marks	20

INSTRUCTIONS: All questions carry equal marks.

Sensitivity Report

Q. No. 1 A furniture store produces beds and desks for college students. The production process requires assembly and painting. Each bed requires 6 hours of assembly and 4 hours of painting. Each desk requires 4 hours of assembly and 8 hours of painting. There are 36 hours of assembly time and 48 hours of painting time available each week. Each bed generates \$35 of profit and each desk generates \$45 of profit. As a result of a labor strike, the furniture store is limited to producing at most 8 beds each week. Determine how many beds and desks should be produced each week to maximize weekly profits. (5 Marks)

Q. No. 2 A real estate developer is planning to build an office complex. Currently, there are three office sizes under consideration: small, medium, and large. Small offices can be rented for \$600 per month, medium offices can be rented for \$750 per month, and large offices can be rented for \$1000 per month. Each small office requires 600 square feet, each medium office requires 800 square feet, and each large office requires 1000 square feet. The current plot of land available to the developer is 100,000 square feet. The developer wants to ensure that the office complex has at least 3 units of each office size. Moreover, zoning restrictions limit the total number of offices to 50. Use the Sensitivity Report to answer the following questions:

Adjusta	able Cells			2		
Cell	Name	Final Value	· Reduced Cost	Objective Coefficient	Allowable Increase	Allowable Decrease
	<b>Optimal Values</b>					
<b>\$B\$4</b>	Small	3	0	600	400	1E+30
	Optimal Values					
\$C\$4	Medium	3	0	750	250	1E+30
2	Optimal Values					
\$D\$4	Large	44	0	1000	1E+30	250

#### Constraints

Cell	Name	Final Value	Shadow Price	Constraint R.H. Side	Allowable Increase	Allowable Decrease
\$E\$8	Square footage	48200	0	100000	1E+30	51800
\$E\$9	Minimum no. of small	3	-400	3	41	3
\$E\$10	Minimum no. of medium	3	-250	3	41	3
	Minimum no. of					
\$E\$11	large	44	0	3	41	1E+30
\$E\$12	Total no. of offices	50	1000	50	51.8	41

a. How many small, medium, and large offices should the developer build?

b. What is the total optimal monthly revenue?

c. How much square footage would remain unused if the developer implements the optimal solution?

d. What would be the impact on the optimal allocation of offices and the objective function value if small offices can be rented for \$800 per month rather than \$600 per month?

e. What would be the impact on the optimal allocation of offices and the objective function value if medium offices can be rented for \$650 per month rather than \$750 per month?

### (5X1 = 5 Marks)

**Q. No. 3** A departmental store wishes to purchase the different type of sarees. Tenders are submitted by three manufacturers who undertake the supply. Transportation cost per unit along with their total manufacturing capacity and total demand of the same mentioned in the following table:

	Types of Sarees					
and a set that the	9.91	T1	T2	T3	T4	Supply
	M1	6	3	5	4	22
Manufacturer	M2	5	9	2	7	15
	M3	5	7	8	6	8
	Demand	7	12	17	9	

How should the optimal order be placed?

### (5 Marks)

**Q. No. 4** A Construction Company has requested bid for subcontracts on four different projects. Four companies have responded. Their bids are represented below:

	Bids Amounts (in thousand)						
a lan ind		Ι	II	III	IV		
Bidders	A	8	26	17	11		
	В	13	28	4	26		
	C	38	19	18	15		
	D	19	26	24	10		

Determine the minimum cost assignment of subcontracts to bidders, assuming that each bidder can receive only one contract. (5 Marks)