

Total No. of Pages: 3

Third Semester

END SEMESTER EXAMINATION

Paper Code: MGT-31

Time: 3 Hours

MBA(G)Program

November-December 2019

Paper Title: Business Analytics

Max Marks: 50

- Marks carried by each question are indicated after the question.
- Use of scientific calculator is allowed.

Q1. a) Define Business Analytics. Explain different categories of business analytics, giving suitable application for each. (5 marks)

b) What do you understand by "Big Data"? How decision-making process is affected by Big Data in current business research? (5 marks)

Q2. a) A "Journal of Business and Data Analytics" subscriber survey asked some 30 questions about subscriber characteristics and interests. State whether each of the following questions provides categorical or quantitative data. (1 mark each)

- What is your age?
- Are you male or female?
- When did you first start reading the JBDA?
- Occupation?
- How have you been in your present job or position?

b) What is simulation? Describe the simulation process. What are the advantages and limitations of simulation? (5 marks)

Q3. *Electronics World* a chain of stores that sells audio and video equipment has gathered the following information as below. These data concerns store sales volume in July ('000\$) and the number of households (measured in '000):

No. of Households	30	45	35	42	52	58
Sales Volume	120	150	140	146	160	165

- Develop a scatter diagram of the above data and interpret it. (1 marks)
- Determine the least square regression equation of sales volumes generated by number of households. (4 marks)
- Interpret regression coefficients b_0 and b_1 . Does the interpretation of b_0 make practical sense? (2 marks)
- Estimate the mean sales volume for 48 households in some store. (1 marks)
- Compute coefficient of determination and interpret it. (2 marks)

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- Q4. Using only the information in the sensitivity report, answer the following questions:
- Determine the optimal solution and the optimal objective function value. (2 marks)
 - Explain the reduced cost associated with x . (2 marks)
 - Explain the shadow price associated with Constraint 2. (2 marks)
 - Find the range of values of the R.H.S. of constraint 2 for which the current basis remains optimal. (2 marks)
 - How do the optimal decision variables and objective function value change if the R.H.S. of constraint 1 increases by 20? (2 marks)

$$\text{Maximize profit } Z = 40x + 35y$$

$$\text{s.t. } 2x + 3y \leq 60 \text{ lb of raw material}$$

$$4x + 3y \leq 96 \text{ hours of Labor}$$

Variable Cells

Cell	Name	Final Value	Reduced Cost	Objective Coefficient	Allowable Increase	Allowable Decrease
\$B\$7	x	18	0	40	6.67	16.67
\$C\$7	y	8	0	35	25	5

Constraints

Cell	Name	Final Value	Shadow Price	Constraint R.H. Side	Allowable Increase	Allowable Decrease
\$D\$3	constraint1	60	3	60	36	12
\$D\$4	constraint2	96	8	96	24	36

Or

An engineering company has received a rush order for a maximum number of two types of items A & B that can be produced and transported during two-week. The sale price for each of the items is dependent upon the quantity to be produced. The sales-price relationships for these two items are as follows:

Items	Quantity produced	Unit Price
A	$1000 - 5p$	p
B	$3000 - 10q$	q

If x and y are the quantities produced for both the items respectively. The production costs for each of the items are $100x + 0.3x^2$ and $500y + 0.2y^2$. There is restriction on the production capacity of the items A and B which are 400 units and 600 units respectively. Similarly there is a restriction on man-power available. Total of 500 man-days are available. The production of one unit of A requires 1 man-day and one unit of B requires 2 man-days. Formulate the above problem as Non-Linear optimization model. (10 marks)

Q5. The owner of the readymade garments store sells two types of premium shirts known as ZEE shirts and STAR shirts. He makes a profit of Rs. 200 and Rs. 300 per shirt on ZEE and STAR shirts respectively. He has two tailors, A & B at his disposal to stitch the shirts. Tailor A can devote a total of 17 hours/day while tailor B can give at the most 15 hours/day. Both types of shirts are stitched by both the tailors. The time needed for stitching a ZEE shirt is two hours by Tailor A and three hours by tailor B. Similarly, A STAR shirt requires 4 hours by tailor A and 3 hours by tailor B.

- Formulate and determine the optimal number of shirts that should be stitched so as to maximize the total daily profit. (use Graphical method) (6marks)
- Is the above problem Integer Programming Problem? (2marks)
- In what conditions Integer and Binary linear models are used? (2marks)