

K. J. Somaiya Institute of Management Studies and Research

Program: MHRDM Semester- II (2017-20 Batch)

Subject: Business Statistics (QT in Management)
(End Term Examination)

Maximum marks: 50

Date: 13/4/2018

Duration: 3 hours

Notes:

- 1. You have to attempt 5 questions in all.**
- 2. Make suitable assumptions if required and state them.**
- 3. Write all relevant answers in your EXCEL sheet, with sufficient detail to enable a fast evaluation of your answers.**
- 4. Keep saving the file on the desktop every ten minutes or so.**
- 5. Make only 1 Excel file with different worksheets pertaining to each question.**
- 6. Name the file with your division and roll number only (no names). Finally, transfer the file to an exam folder, as per on-the-spot instructions given to you.**

1. **10 Marks**

- a. A manufacturing company is engaged in producing three types of products: A, B & C. The production department daily produces components sufficient to make 50 units of A, 25 units of B, and 30 units of C. The management wants to optimize the daily production of products in assembly department where only 100 man-hours are available daily to assemble the products. Product A takes 0.8 hrs/unit, Product B 1.7 hrs/unit and Product C 2.5 hrs/unit of assembly time. The company has a daily order commitment for 20 units of product A and a total of 15 units of B & C product. The profit contribution/unit of product A is Rs 12, Product B Rs. 20 & Product C Rs. 45. Formulate this problem as a LP model so as to maximize the total profit. (**Do not solve this LPP for optimum solution**)
- b. A company has two plants each of which produces and supplies two products A and B. The plants can each work up to 16 hours a day. In plant 1, it takes 3 hrs to prepare and pack 1000 gallons of A and 1 hour to prepare and pack one quintal of B. In plant 2 it takes 2 hours to prepare and pack 1000 gallons of A and 1.5 hours to prepare and pack one quintal of B. In plant 1 it costs Rs. 15,000 to prepare and pack 1000 gallons of A and Rs. 28 000 to prepare and pack a quintal of B, whereas these costs are Rs. 18000 and 26000 respectively in plant 2. The company is obliged to produce daily at least 10,000 gallons of A & 8 quintals of B. Formulate this problem as LP model to find out as to how the company should organize its production, so that the required amounts of the two products are obtained at minimum costs. (**Do not solve this LPP for optimum**)

solution)

2. The outdoor furniture corporation manufactures two products; benches and picnic tables for use in gardens and parks. The firm has two main resources, its carpenters (Labour force) and a supply of redwood for use in furniture. During the ext production cycle, 1200 hours of manpower are available under a union agreement. The firm has a stock of 3500 kgs of quality redwood. Each bench requires 4 labour hours and 10 kgs of redwood. Each picnic table takes 6 labour hours and 35 kgs of redwood. Completed bench will yield a profit of Rs. 90 each and table will result in a profit of Rs. 200 each. How many tables and benches should be produced in order to obtain maximum profit? Solve the Problem using **Excel Solver as well as using graph** **10 Marks**

3. A catering manager is in the process of replacing the furniture in the canteen. He wishes to determine how many tables of type S (seating 6) and how many of type T (seating 10) to buy. He estimates that each type S table needs 7 meters sq. Of floor space while each type T needs 9. He has to work under the following constraints:
(i) The canteen must be able to accommodate at least 60000 people.
(ii) The available floor space of the canteen is at most 63000 sq. Meters. Advice the manager on how many tables of each type to buy if type S Rs. 100 and each type T costs Rs. 190. Do sensitivity analysis and explain in detail. (Use solver.) **10 Marks**

4. A solicitor's firm employs typists on a hourly price rate basis for their daily work. There are five typists and their charges & speed are different. According to an early understanding only one job is given to one typist and thee typist is paid for a full hour even if he works for a fraction of hour. Find thee least cost allocation for the following data. **10 Marks**

Typist	Rates per hour (Rs.)	No. Of pages typed/hr	Job	No. Of pages
A	5	12	P	199
B	6	14	Q	175
C	3	8	R	145
D	4	10	S	298
E	4	11	T	178

5. The manager of ABC Ltd. has just received demand forecasts and capacity (supply) figures for next month. These are summarized along with unit transportation costs (in \$) in the

following transportation table:

To From	D1	D2	D3	D4	D5	Supply
O1	8	4	12	11	9	220
O2	7	6	10	5	6	260
O3	12	13	9	16	9	200
Demand	140	180	150	140	195	

Solve this transportation problem as an LPP to minimize the total cost. Use Excel Solver.

10 Marks

6. The probability that a worker in a factory has a disease induced by the chemical is 0.6. If a group of 5 workers is taken. Find the probability that

10 Marks

- No worker has the disease
- One worker has the disease
- More than 2 workers have the disease
- At least three have disease
- At the most 2 have the disease

7. Find the seasonal indices for following data. And predict sales for year 2011

10 Marks

Year	Quarters			
	I	II	III	IV
2006	30	40	36	34
2007	34	52	50	44
2008	40	58	54	48
2009	74	76	68	42
2010	80	92	86	82

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