

**K. J. Somaiya Institute of Management Studies and Research**

**Program: MFM Semester- I (2018-21 Batch)**

**Subject: QUANTITATIVE METHODS IN BUSINESS  
(EndTerm Examination)**

Maximum marks: 50  
22/11/2018

Duration: 3 hours

Date:

**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. Find the seasonal indices for following data. And predict sales for year 2018

**10 Marks**

| Year | Quarters |    |     |    |
|------|----------|----|-----|----|
|      | I        | II | III | IV |
| 2013 | 28       | 41 | 32  | 32 |
| 2014 | 35       | 50 | 54  | 43 |
| 2015 | 42       | 54 | 58  | 44 |
| 2016 | 70       | 75 | 63  | 59 |
| 2017 | 80       | 92 | 82  | 82 |

2. The Furniture Décor manufactures two products; benches and picnic tables for use in gardens and parks. The firm has two main resources, its carpenters (Labor force) and a supply of redwood for use in furniture. During the 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 labor hours and 10 kgs of redwood. Each picnic table takes 6 labor 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 and write your managerial report.

**10 Marks**

3. Attempt the following:

- a) The manager of an oil refinery must decide on the optimal mix of two possible blending processes of which the inputs & outputs per production run are as follows:

| Process | Input Units |         | Output Units |            |
|---------|-------------|---------|--------------|------------|
|         | Crude A     | Crude B | Gasoline X   | Gasoline Y |
| 1       | 5           | 3       | 5            | 8          |
| 2       | 4           | 5       | 4            | 4          |

The maximum amounts available of crude A & B are 200 units & 150 units respectively. Market requirement shows that at least 100 units of Gasoline X and 80 units of Gasoline Y must be produced. The profit per production run from process1 & process2 are Rs. 300 and Rs. 400. Formulate this problem as LP.

**5 Marks**

- b) 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.

**5 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          |

4. Attempt the following:

- a) The income of a group of 10000 persons was found to be normally distributed with mean Rs. 750 p.m. and SD Rs. 50. This group's about 95% has income exceeding Rs. 668 and only 5% has income exceeding Rs. 832. What was the lowest income among the richest 100?

**5 Marks**

- b) A student majoring in finance is trying to decide upon the number of firms to which he should apply. Given his work experience and academic records, he has been told by a placement coordinator that he can expect to receive a job offer from 80% of the firms to which he applies. Wanting to save time the student applies to 7 firms only. Assuming that coordinators estimate is correct. Find the probability that the student receives: (i) No offer, (ii) at most two offers and (iii) four or more offers

**5 Marks**

5. Attempt the following:

- a) A small town has 5600 residents. The residents in the town were asked whether or not they favored a new bridge across the river. You are given the following information on the residents' responses, broken down by gender.

|          | Men  | Women | Total |
|----------|------|-------|-------|
| In Favor | 1400 | 280   | 1680  |
| Opposed  | 840  | 3080  | 3920  |
| Total    | 2240 | 3360  | 5600  |

Please show whether opinion and gender are independent events.

**5 Marks**

- b) A water purifier sales person finds that the probability of selling a unit to a prospective buyer is 0.30 but improves to 0.60 on the second contact. The sales person will not contact a prospective buyer more than twice. If the salesman contacts a prospective buyer, determine the probability that the buyer will buy a water purifier?

**5 Marks**

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