# END TERM EXAMINATION

### SECOND SEMESTER [BBA] MAY-JUNE 2015

| Paper Code: BBA/TTM/B&I/MOM-106 | Subject: Quantitative Techniques and Operations Research in Management |
|---|---|

**Time: 3 Hours**  **Maximum Marks: 75**

**Note: Attempt any five questions including Q.no.1 which is compulsory.**

Q1  (a) Following is the distribution of marks in Economics obtained by 50 students: **(5)**

| Marks (more than): | 0 | 10 | 20 | 30 | 40 | 50 |
|---|---|---|---|---|---|---|
| No. of students | 100 | 92 | 80 | 40 | 20 | 6 |

Calculate the median marks. If 60% of the students pass this test, find the minimum marks obtained by a pass candidate.

(b) "The arithmetic mean is best amongst all the averages." Why or Why not? **(5)**

(c) Write a brief note on Lorenz Curve. **(5)**

Q2  (a) The mean and standard deviation of 100 items are found to be 120 and 20 calculations, two items were wrongly taken as 23 and 7, instead of 13 and 17, find the correct mean and standard deviation. **(5)**

(b) What is the meaning of normalcy of data? How is it measured? **(5)**

(c) Distinguish between skewness and dispersion. **(5)**

Q3  From the following data, calculate the Karl Pearson's coefficient of correlation between age of students and their playing habits: **(15)**

| Age: | 15 | 16 | 17 | 18 | 19 | 20 |
|---|---|---|---|---|---|---|
| No. of students: | 250 | 200 | 150 | 120 | 100 | 80 |
| Regular Players: | 200 | 150 | 90 | 48 | 30 | 12 |

Q4  The age and blood pressure of 10 university teachers are:

| Age | 46 | 45 | 36 | 47 | 49 | 42 | 60 | 72 | 63 | 55 |
|---|---|---|---|---|---|---|---|---|---|---|
| Blood Pressure | 147 | 125 | 118 | 140 | 142 | 145 | 155 | 160 | 148 | 151 |

(a) Find the correlation coefficient between age and blood pressure. **(5)**

(b) Determine the least square regression equation of blood pressure on age. **(5)**

(c) Estimate the blood pressure of a teacher whose age is 35 years. **(5)**

Q5  A company sells two different products A and B. The selling price and incremental cost information are as follows:

|  | Product A | Product B |
|---|---|---|
| Selling Price | Rs. 60 | Rs. 40 |
| Variable Cost | Rs. 30 | Rs. 10 |

**P.T.O.**

The two produced in a common production process and are sold in two different markets. The production process has a capacity of 30,000 man hours. It takes three hours to produce a unit of A and one hour to produce a unit of B. The market has been surveyed and the company officials feel that the maximum number of units of A that can be sold is 6,000 and maximum for B is 12,000 units. Subject to these limitations two products can be sold in any combination. Formulate the problem as LP model and solve to maximize contribution. **(15)**

Q6 What do you understand by duality? What is its utility in decision making? Convert a primal problem of maximization into a problem of minimization with dual principle. **(15)**

Q7 A wholesale company has three warehouse from which supplies are drawn for four retail customers. The company deals in a single product, the supplies of which at each warehouse are:

| Warehouse no. | Supply (units) | Customer no. | Demand (units) |
| --- | --- | --- | --- |
| 1 | 20 | 1 | 15 |
| 2 | 28 | 2 | 19 |
| 3 | 17 | 3 | 13 |
|  |  | 4 | 18 |

The following table gives the transportation costs per unit shipment from each warehouse to each customer.

| Warehouse | Customer | | | |
| --- | --- | --- | --- | --- |
|  | 1 | 2 | 3 | 4 |
| 1 | 3 | 6 | 8 | 5 |
| 2 | 6 | 1 | 2 | 5 |
| 3 | 7 | 8 | 3 | 9 |

Determine what supplies to dispatch from each of the warehouse to each customer so as to minimize over all transportation cost. **(15)**

Q8 A method Engineer wants to assign four new methods to three work centres. The assignment of the new methods will increase production and they are given below. If only one method can be assigned to a work centre, determine the optimum assignment: **(15)**

| Increase in production (unit) | | | |
| --- | --- | --- | --- |
| Methods | Work Centres | | |
|  | A | B | C |
| 1 | 10 | 7 | 8 |
| 2 | 8 | 9 | 7 |
| 3 | 7 | 12 | 6 |
| 4 | 10 | 10 | 8 |

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