Code: 06MC204

MCA II Semester Supplementary Examinations, March 2013
**OPERATIONS RESEARCH**

Time: 3 hours                                                                                    Max Marks: 60

Answer any FIVE questions
All questions carry equal marks
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1   (a)   What are the phases of an operations research study?
    (b)   Use simplex method to solve the following LPP.
          Maximize   $z = 4x_1 + 10x_2$
          Subject to the constraints :  $2x_1 + x_2 \leq 50$
                                          $2x_1 + 5x_2 \leq 100$
                                          $2x_1 + 3x_2 \leq 90$
                                          $x_1, x_2 \geq 0.$

2   (a)   State the difference between the T.P and A.P.
    (b)   What is the objective of the travelling salesman problem? Explain travelling salesman problem with an
          example.

3         The yearly cost of two machines A and B, when money value is neglected is shown below. Find the cost
          patterns if money is worth 10 percent per year and hence find which machine is more economical.

| Year              | 1     | 2     | 3     |
|-------------------|-------|-------|-------|
| Machine A (Rs.) : | 1,800 | 1,200 | 1,400 |
| Machine B (Rs.) : | 2,800 | 1,200 | 1,400 |

4   (a)   Write notes on replacement of capital items when money value in considered.
    (b)   A machine costs Rs 10,000. Operating costs are Rs 50 per year for the first five years. In the sixth and
          succeeding year operating costs increase by 100 per year. Find the optimum length of time to hold the
          machine before replacing it.

5   (a)   A state three applications of waiting line theory in business enterprises.
    (b)   A barber takes exactly 25 minutes to complete one hair cut. If customer arrive in a Poisson fashion at an
          average rate of 1 every 40 minutes how long, on an average, must a customer wait for service.

6         What are the types of inventory? Why are they maintained? Explain the various costs related to
          inventory.

7   (a)   Explain the relationship between 'Game theory' and 'Linear programming' with an example.
    (b)   What are the major limitations of game theory?

8         Solve the following LPP by dynamic programming
          Maximize       $z = 2x_1 + 3x_2$
             Subject to        $x_1 - x_2 \leq 1$
                               $x_1 + x_2 \leq 3$
                               $x_1, x_2 \leq 0.$
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