Code No: **R31032/R10**

III B.Tech I Semester Supplementary Examinations, November - 2015
OPERATIONS RESEARCH
(Mechanical Engineering)

Time: 3 hours　　　　　　　　　　　　　　　　　　　**Max. Marks: 75**

Answer any FIVE Questions
All Questions carry equal marks
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1　Solve the following LPP using Simplex method :　　　　　　[15M]

$Max\ Z = x_1 + 2x_2$

$2x_1 + 3x_2 \geq 6$

$x_1 + 2x_2 \leq 8$

$x_1, x_2 \geq 0$

2　We have five jobs each of which must go through the machines A, B and C in the order ABC. Determine the sequence that will minimize the total elapsed time.　　[15M]

Job No	1	2	3	4	5
M/C A	5	7	6	9	5
M/C B	2	1	4	5	3
M/C C	3	7	5	6	7

3　A stamping machine currently valued at Rs.19,000 is expected to last 2 years and costs Rs.4000 per year to operate. Another machine which can be purchased for Rs.30,000 will last for 4 years and be operated at an annual cost of Rs 3000. If money carries the rate of interest at 10% per annum, determine which stamper, machine should be purchased.　　[15M]

4　Solve the following game:　　　　　　　　　　　　　　[15M]

Player B

Player A

1	7	2
6	2	7
5	1	6

5　a)　How do you classify the queuing models? Explain.　　[8M]

　b)　In a supermarket, the average arrival rate of customer is 10 every 30 minutes following Poisson process. The average time taken by a cashier to list and calculate the customers purchase is 2.5 minutes following exponential distribution. What is the probability that the queue length exceeds 6? What is the expected time spent by a customer in the system?　　[7M]

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6   Determine a decision rule using the basic purchasing EOQ model for annual demand of   [15M]
     20,000 units, ordering cost of Rs.200 per order and carrying cost of 10% per year. The
     basic price is Rs.8.00 per unit. This price is in effect of all orders of less than 5000 units.
     Orders for 5000 or more but less than 10000 units may be purchased for Rs.7.50 per
     unit. Orders for 10000 or more units may be purchased for Rs.7.25 per unit.

7   Apply Dynamic programming to $Max\ Z = 2x_1 + 3x_2$ Subjected to   [15M]
     $x_1 + 2x_2 \leq 4$
     $x_2 \leq 3$
     $x_1, x_2 \geq 0$
                                                                                    [8M]
8 a) Write the principal features of simulation languages.

   b) What are the major limitations of simulation? Explain.   [7M]

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