AC-360

BCA IV Semester Examination, June 2015

(New Course)

Optimization Techniques

C-404

Time : Three Hours]   *[Maximum Marks : 75*

[Minimum Marks : 30

Note : Attempt any **five** questions. **All** questions carry equal marks.

1. (a) Explain, How can we convert a problem into mathematical form?

    (b) Solve graphically the following LPP :

    $$\text{Max. } Z = 3x_1 + 5x_2$$

    Subject to : $x_1 + 2x_2 \leq 2000$

    $$x_1 + x_2 \leq 1500$$

    $$x_2 \leq 600$$

    $$x_1, x_2 \geq 0.$$

2. (a) What do you mean by Primal and dual?

    (b) Solve the given LPP using two-phase method.

    $$\text{Max } Z = x_1 + 2x_2 + 3x_3$$

    Subject to :

    $$x_1 - x_2 + x_3 \geq 4$$

    $$x_1 + x_2 + 2x_3 \leq 8$$

    $$x_1 - x_3 \geq 2$$

    $$x_1, x_2, x_3 \geq 0$$

3. (a) State a transportation problem. When does it have Unique Solution?

    (b) Solve the transportation problem and find the optimal solution :

	D_1	D_2	D_3	D_4	Available
O_1	1	2	1	4	30
O_2	3	3	2	1	50
O_3	4	2	5	9	20
Required	20	40	30	10	100

4. (a) What do you mean by Queue? Give some applications of queuing theory.

   (b) Arrivals at a telephone booth are considered to be Poisson with average time of 10 minutes between one arrival and the next. The length of the phone call assumed to be distributed exponentially with mean time 3 minutes, then.

   (i) What is the probability that person arriving at the booth will have to wait?

   (ii) What is the average length of the queue that form from time to time.

5. (a) What is replacement problem? Describe some important replacement situations.

   (b) The cost of machine is Rs. 6100 and its scrap value is only Rs. 100. The maintenance costs are found from experiences to be

Year :	1	2	3	4	5	6	7	8
Cost :	100	250	400	600	900	1250	1600	2000

   For maintenance

   when should machine be replaced.

6. (a) Explain the various costs that are involved in inventory problems with suitable example.

   (b) What do you mean by EOQ?

7. (a) Solve the following assignment problem

		Machine		
Job	A	B	C	D
1	3	6	2	6
2	7	1	4	4
3	3	8	5	8
4	6	4	3	7
5	5	2	4	3
6	5	7	6	4

   (b) Discuss sequencing of n jobs through 3 machines.

8. Write short notes on any **three** of the following :

   (i) tic-tac problem

   (ii) M/M/1 Queuing Model

   (iii) Dual Simplex Method

   (iv) History of OR.