(b) A project work consist of four major jobs for which an equal number of contractors have submitted tenders. The quoted amount (given in lakhs) is given in the matrix: 10

Jobs

		A	B	C	D
Contractor	1	10	24	30	15
	2	16	22	28	12
	3	12	20	32	10
	4	9	26	34	16

Find the assignment which minimize the total cost of the project when each contractor have to be assigned at least one job.

Unit-II

4. Obtain an initial basic feasible solution to the following Transportation Problem using the

A (Printed Pages 7)

Roll No. _____

SFS-4711

B.C.A. (Semester-IV) Examination, May 2015

(New Syllabus)

Paper-IV

(Optimization Techniques)

(BCA-S-209)

Time Allowed : Three Hours] [Maximum Marks : 100

Note : (i) Answer five questions in all, including Question No.1, Which is compulsory and attempt one question from each Unit.

(ii) Scientific calculator may be allwoed.

1. Attempt all the following parts: 4×10=40

(a) What are the steps involved in Operation Research problem?

(b) What is Linear Programming? What are its major assumption & characteristics?

(c) What do you understand by Objective Function, State it in an example. Also state type of Objective function possible in Optimization Technique.

(d) Define Feasible Solution & Basic Feasible Solution.

(e) What do you mean by Analogue models?

(f) Explain Analytical and Simulation model in brief.

(g) What is meant by feasible region? Write the steps to solve LPP by graphical Method.

(h) What is an assignment problem? Give its two applications. Also explain difference between Assignment & Transportation problem.

(i) Explain North West Corner Method in Steps (point wise).

(j) Explain the primal-dual relationship.

Unit-I

2. (a) What is OR (Optimization Techniques)? Briefly review its origin & Development. State different types of models used in OR. 5

(b) Discuss steps used in Linear Programming Model formulation in details. 10

3. (a) Give an algorithm (steps) to solve assignment problem. 5

Vogel's approximation method. 15

Ware house	Stores				Availability
	I	II	III	IV	
A	5	1	3	3	34
B	3	3	5	4	15
C	6	4	4	3	12
D	4	-1	4	2	19
Requirement	21	25	17	17	80

5. (a) What is Queuing Theory? Explain the concept of finite and infinite queuing. 5

(b) Maximize $Z=100x_1+40x_2$ 10

Subject to constraints

$10x_1+4x_2<=2000$

$3x_1+2x_2<=900$

$6x_1+12x_2<=3000$

and $x_1, x_2>=0$

Solve via graphical method to find the solution.

Unit-III

6. (a) Obtain the dual of the following Primal LP problem 7

$-2x_1 + x_2 + 3x_3 = 2$

$2x_1 + 3x_2 + 4x_3 = 1$

$x_1, x_2, x_3 >= 0$

(b) What is Simplex method of solving LPP? Give standard form of LP problem involved in Simplex method. 8

7. (a) Use the Simplex method to solve the following LP Problem Maximize $Z = 3x_1 + 5x_2 + 4x_3$ Subject to the constraints 15

$2x_1 + 3x_2 + s_1 = 8$

$2x_2 + 5x_3 + s_2 = 10$

$2x_1 + 2x_2 + 4x_3 + s_3 = 15$

And $x_1, x_2, x_3, s_1, s_2, s_3 >= 0$

Unit-IV

8. (a) Explain the four elements that characterize a sequencing problem. 5

(b) Find The sequence that minimizes the total elapsed time required to complete the following tasks on two machines 10

Tasks:	A	B	C	D	E	F	G	H	I
Machine I:	2	5	4	9	6	8	7	5	4
Machine II:	6	8	7	4	3	9	3	8	11

9. (a) Explain Notations, and Assumptions of Job Sequencing Problem. 5

(b) Write the algorithm(steps with suitable example) of processing n Jobs through two machines. 10