MCA/ M11
Computer Oriented Optimization Techniques
Paper : MCA 204

Time: Three Hours **Maximum Marks: 80**

Note:
(i) Attempt FIVE Questions in all
(ii) Question No. 1 is compulsory
(iii) Attempt remaining Four questions by selecting only ONE question from each Unit

1. (a) Define O.R.
(b) Comment on the following "O.R. gives the best result"
© Define slack variable with suitable examples.
(b) Define Degeneracy.
(c) Define Mixed integer programming with examples
(d) Define an assignment problem.
(e) Define deterministic models.
(f) Explain forward and backward pass computation

UNIT-I

1. What is a model? Discuss its principles and classification schemes of it.
2. (a) Discuss the main characteristics of O.R.
(b) State the development of O.R. in India
4. (a) Express the following LPP in the Standard form

Min. $Z=x_1 - 2x_2 + x_3$

Subject to constrains:

$2x_1 + 3x_2 + 4x_3 \geq -7$

$3x_1 + 5x_2 + 2x_3 \geq 10$

$x_1 \geq 0, x_2 \geq 0, x_3$ is unrestricted in sign

(b) What is the necessities of Duality and discuss also Primal and Dual

5. Solve the following LPP by Two Phase method

Min. $Z=15/2x_1 + 3x_2$

Subject to constraints

$3x_1 - x_2 + x_3 \geq 3$

$x_1 - x_2 + x_3 \geq 2$

$x_1, x_2, x_3, \geq 0$

UNIT-III

6. State the integer programming and solve the following LPP:

MAX. $z=x1 + 2x2$
Subject to Constraints
$2x2 \leq 7$
$x1 + x2 \leq 7$
$2x1 \leq 11$

$x1, x2, \geq 0$ and are integers

7 (a) Discuss the mathematical formulation of an assignment problem.
(b) Define an unbalanced assignment problem. Whether the following problem is an unbalanced problem or not?

		Jobs				
		1	2	3	4	5
Machines	1	2.5	5.0	1.0	6	1.0
	2	2.0	5.0	1.5	7	3.0
	3	3.0	6.5	2.0	8	3.0
	4	3.5	7.0	2.0	9	4.5
	5	4.0	7.0	3.0	9	6.0
	6	6.0	9.0	5.0	10	6.0

UNIT-IV

8. (a) State the Customer's behavior in a queuing system.

(b) A TV repairmen finds that the time spent on his jobs has an exponential distribution with mean 30 minutes. If he repairs sets in the order in which they come in and if the arrival of sets is approximately poison with an average rate of 10 per 8 hour day. What is repairman's expected idle time each day? How many jobs are ahead of the average set just brought in?

9. (a) What do you mean by PERT and CPM? Explain the difference between them.

(b) A project has the following time schedule:

Activity	Time in Month	Activity	Time in month
1-2	2	4-6	3
1-3	2	5-8	1
1-4	1	6-9	5
2-5	4	7-8	4
3-6	8	8-9	3
3-7	5		

Construct PERT network and compute:

(g) Critical path and its duration.

(ii) Critical activity.