Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/M.TECH(CSE)/SEM-2/PGCS-205 H/2012

2012
OPERATION RESEARCH AND APPLICATIONS

Time Allotted : 3 Hours *Full Marks* : 70

The figures in the margin indicate full marks.
Candidates are required to give their answers in their own words as far as practicable.

Graph sheet(s) will be supplied by the Institute on demand.

Answer Question No. 1 and any *five* from the rest.

1. Answer any *five* from the following : $5 \times 2 = 10$

   a) Discuss at least 2 characteristics of linear programming.

   b) In which situation, Dual Simplex method may be more useful than Simplex method ?

   c) What is "red flag" in Critical Path Method ?

   d) How game theory can be utilized in the corporate world ?

   e) Write down 2 applications of integer programming.

   f) What is the advantage of Floyd's algorithm over Dijkstra's algorithm ?

2. a) Graphically solve the following LPP : 10

Maximize $Z = 6x_1 + 4x_2$

subject to $7x_1 + 5x_2 \le 35$

$5x_1 + 7x_2 \le 35$

$4x_1 + 3x_2 \ge 12$

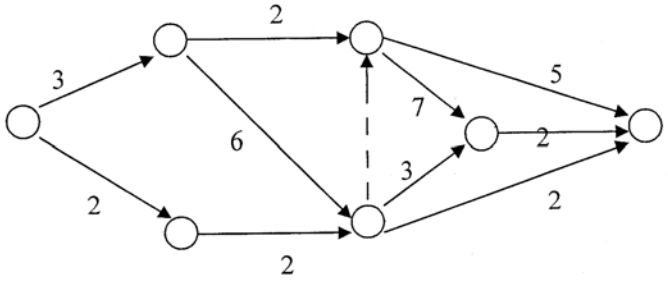
$3x_1 + x_2 \ge 3$

$x_1 \ge 0$

$x_2 \ge 0$

b) What is alternate optima ? 2

3. Determine the total float and free float for all the non-critical activities of the following project network. 12



4. a) Consider the following LPP :

Maximize $Z = 4x_1 + 5x_2$

subject to $x_1 + x_2 \le 5$

$6x_1 + 10x_2 \le 45$

where $x_1, x_2 \ge 0$

If the real solution of the problem is $x_1 = 1.25$ and $x_2 = 3.75$, find out integer solution of the above, using Branch and Bound algorithm. 9

b) Write short notes on dynamic programming mentioning its characteristics. 3

5. a) Solve the game whose payoff matrix is given below : 9

3	2	4	0
3	4	2	2
4	2	4	0
0	4	0	8

b) What is the meaning of two persons zero sum game ? Is there any two person non-zero sum game ? Give an example. 3

6. A transportation cost matrix is given below :

a) Find starting solution using Vogel's approximation method. 3

	1	2	3	4	Supply
1	10	2	20	11	15
2	12	7	9	20	25
3	4	14	16	18	10
Demand	5	15	15	15	

b) Using the calculated starting solution, find out final solution. 9

7. a) Solve the following assignment problem : 9

Jobs

Workers	1	2	3	4	5
1	3	8	2	10	3
2	8	7	2	9	7
3	6	4	2	7	5
4	8	4	2	3	5
5	9	10	6	9	10

b) Explain when simulation is used. In a proposed McDonald outlet, what parameters can be studied using simulation ? 3