

III B.Tech I Semester Supplementary Examinations, November 2006
OPERATIONS RESEARCH

(Common to Computer Science & Engineering and Electronics &
 Computer Engineering)

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
 All Questions carry equal marks

1. Use Simplex method to

Maximise $Z = 2x_1 + 5x_2$

Subject to Constraints:

$x_1 \leq 40,$

$x_2 \leq 30,$

$x_1 + x_2 \geq 60$ and

$x_1, x_2 \geq 0$

[16]

2. (a) Name three methods of finding an initial basic feasible solution to a transportation problem.

- (b) Four gasoline dealers A,B,C and D require 50,000, 40,000, 60,000 and 40,000 gal of gasoline respectively. It is possible to supply these demands from locations 1,2 and 3, which have 80,000, 1,00,000 and 50,000 gal respectively. The costs for shipping 1,000 gal of gasoline are given in the table such that costs Rs.70 per 1000 gal to ship gasoline from location 1 to dealer A, Rs 80 per 1000 gal from location 2 to dealer B, etc.

Cost of shipping 1000 gas of gasoline

	A	B	C	D
1	70	60	60	60
2	50	80	60	70
3	80	50	80	60

Determine the amounts of gasoline to be shipped from each location to each dealer so that all the dealers's requirements are satisfied and the total shipping costs are a minimum [3+13]

3. Find the sequence of jobs that minimizes the total time elapsed to complete the jobs with the following data. Sequence is
- $M_1 M_2$
- .

Job	1	2	3	4	5	6
Machine M_1	4	10	16	10	12	9
Machine M_2	8	9	8	6	12	2

Also find the total elapsed time and idle times of each machine

[16]

4. A decision has to be made for group replacement versus individual replacement policy for 500 fluorescent tubes of a particular make in the university campus. Failure rate for the tubes were recorded as under:

End of month	1	2	3	4	5	6
Prob. Of failure	0.11	0.30	0.25	0.20	0.10	0.04

Cost of replacing an individual tube is Rs.55 and when replaced as group it is Rs.35. Find out whether group replacement policy is economical or not. If economical at the end of which month should the tubes be replaced as a group? [16]

5. (a) Briefly explain the properties found in competitive games
(b) Reduce the following game by dominance and find the game value:

[4+12]

		Player B			
		I	II	III	IV
Player A	I	3	2	4	0
	II	3	4	2	4
	III	4	2	4	0
	IV	0	4	0	8

6. People arrive to purchase the cinema tickets at the First Class Ticket counter of a theatre at a rate of 150 per hour. There is one clerk issuing the tickets at the rate of 400 per hour : Find
- the probability that there is no single person in counter to purchase the ticket
 - The probability that a person is being served and nobody is waiting
 - the probability that there is no person waiting to be served
 - the probability that there are more that 25 people in the counter. [16]
7. (a) What are the relevant costs for inventory decisions? How are they obtained in real life situations?
- (b) The annual demand for a component is 7200 units. The carrying cost is Rs. 500/unit/year. The ordering cost is Rs. 1500/- per order and the shortage cost is Rs. 2000 / unit / year. Find the optimal values of Economic Order Quality, maximum inventory, maximum shortage capacity, and cycle time. [6+10]
8. State the principle of optimality and apply it to solve the following problem. A member of a certain political party is making plans for his elections to the parliament. He has received the service of 6 volunteer workers and wishes to assign them to three districts in such a way as to maximize their effectiveness . He feels that it would be insufficient to assign a worker to more than one district but he is willing to no worker to any one of the district if they can accomplish in other districts. The following table gives the estimated increase in the number of votes in his favor in each district. If it were allocated various number of workers.

Code No: NR310502

NR

No.of Workers	Districts		
	1	2	3
0	0	0	0
1	25	20	33
2	42	38	43
3	55	54	47
4	63	65	50
5	69	73	52
6	74	80	53

How many of the six workers should be assigned to each of the three districts in order to maximize total estimated increase in number of votes in his favor? [16]
