

DR. V. N. BEDEKAR INSTITUTE OF MANAGEMENT STUDIES

MMS SEM II END SEMESTER EXAMINATION APRIL 2007

OPERATIONS RESEARCH

TIME 3 HRS.

Date : 18/4/2007
MARKS 100

- N.B.
- 1) Attempt any FIVE questions
 - 2) Figures to the right indicate full marks
 - 3) Use of Calculator is allowed.
 - 4) Statistical tables will be provided on request

Q1 Write short notes on (Any FOUR) (5x4=20)

- i) Sensivity Analysis
- ii) Primal, Dual problems
- iii) Hurwitz's criterion
- iv) Branch and Bound method
- v) Simulation
- vi) Pure and Mixed Strategies

Q.2 Solve the following LPP by Graphical method

Minimize $Z = 4x + y$

Subject to

$3x + 4y \geq 20,$

$x + 5y \geq 15$

$x, y \geq 0$

(20)

Q.3 Six machines A, B, C, D, E, F are to be placed at places 1, 2, 3, 4, 5, 6. The cost of locating i th machine at j th place is given below. Using assignment method decide which should be placed at which location to minimize the total cost.

	1	2	3	4	5	6
A	200	230	180	100	160	200
B	500	200	170	160	150	110
C	600	300	400	550	080	070
D	060	070	100	200	250	090
E	180	210	280	170	600	700
F	090	100	200	300	400	550

(20)

Q.4 A salesmen has to visit 5 cities A B C D E in a cycle. The distance or cost matrix is given below Find an optimum route.

From:	A	B	C	D	E
To					
A	M	0	18	18	0
B	0	M	12	17	4
C	0	4	M	15	5
D	7	0	17	M	8
E	5	0	20	22	M

(20)

Q.5 A marketing and distribution organization is supplying material from five sources S1 to S5 to five depots D1 to D5. Transportation costs per 10 kg in rupees are given below : Find optimum solution.

From:	D1	D2	D3	D4	D5
To:					
S1	1.6	0.6	1.4	2.2	1.8
S2	2.4	1.0	0.8	1.2	2.4
S3	1.4	2.0	2.8	3.2	2.0
S4	2.0	2.2	3.0	2.8	1.2
S5	1.8	2.0	1.8	1.2	1.0

(20)

Q. 6 A stall owner makes and sells cookies everyday. Over a period of time she established the probability of selling cookies as follows

Demand:	0	10	20	30	40	50
Probability:	0.05	0.10	0.20	0.35	0.20	0.10

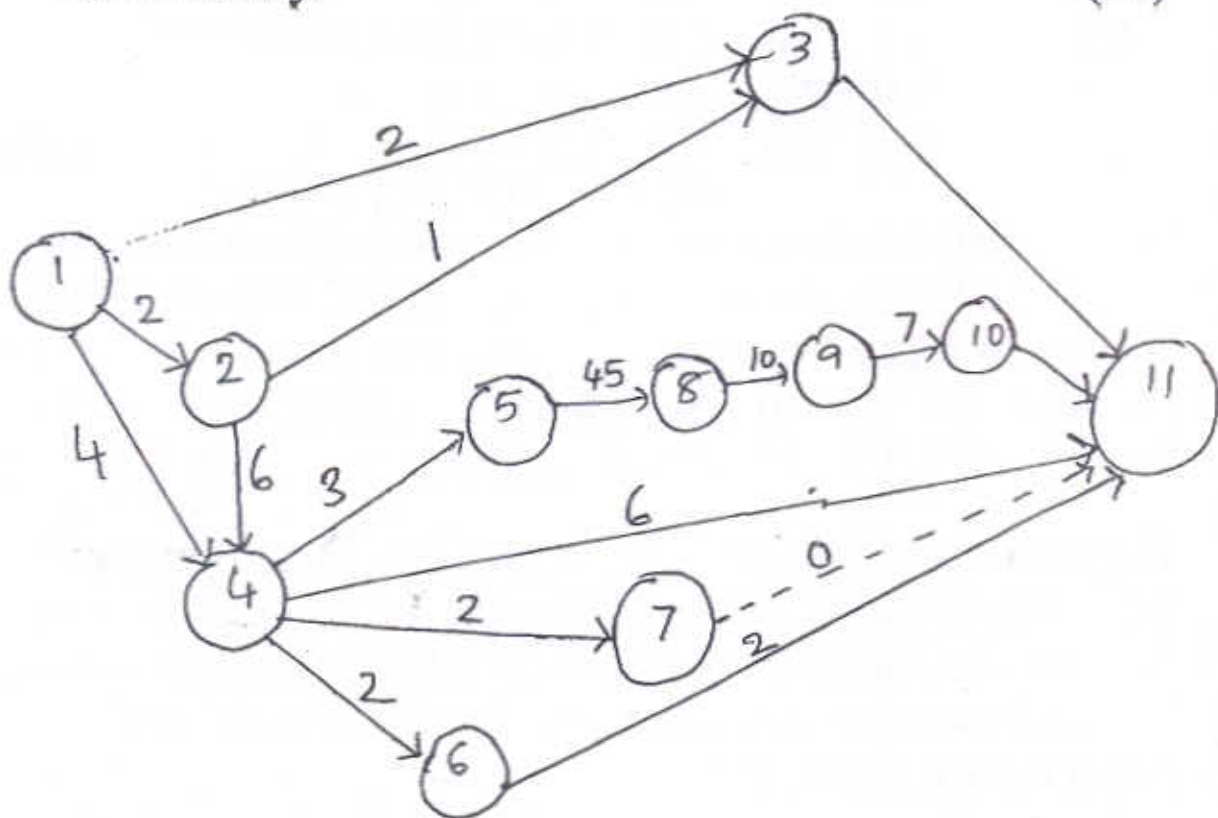
The manufacturing cost is Rs. 6 per piece. The selling price is Rs. 10 per piece. If the cookies are not sold on the same day the material gets deteriorated and carries no sale value. Decide how many cookies the owner should make every day. Find EP, EPPI, EVPI. (20)

Q.7 Given the payoff matrix for player X, obtain the optimum strategies for both the players and determine the value of the game.

Player X	Player Y		
		6	-3
	-3	0	4

(20)

Q.8 For the following PERT diagram compute i) earliest event time and latest event time.ii) Critical path and total project duration.iii) Total, free and independent float for each activity. (20)



Q.9 Table below shows the activities involved in a small R and D project., their dependencies and the optimistic (a), most likely (m), pessimistic (b) time estimates.

- i) Draw an arrow diagram, ii) Compute the total floats for each activity using the expected duration of the activities. Hence find the critical path and expected duration of the project.iii) find the probability of completing the project by 57 weeks. What is the chance of completing by 40th week?

Activity	Immediate Predecessor	Duration (Weeks)		
		a	m	b
A	None	3	6	9
B	None	3	6	15
C	B	3	9	15
D	A	5	8	17
E	C,D	3	6	21
F	E	4	10	28
G	E	8	8	8
H	C,D	4	10	16
I	F	4	13	28

(20)

Q.10 A Company manufactures 2 products :P and Q .
The costs and prices per unit of P and Q are as follows.

	P	Q
Selling price/unit	8	13
Variable cost/unit	5	8
Contribution Margin		
Per unit	3	5
Machine Hrs reqd		
Per unit	1	3
Raw material reqd		
Per unit (kg)	4	2

Total machines hours available are limited to 1,50,000.

Total raw material available is 2,00,000 kg.

It is required to find out the product mix that will maximize the profits of the company.

Formulate the above problem as LPP and solve it by Simplex method.

(20)
