



BE (FULL TIME) DEGREE END SEMESTER EXAMINATION APRIL/MAY 2011
INDUSTRIAL ENGINEERING BRANCH
 SEMESTER V
IE 375 PROBABILISTIC OPERATIONS RESEARCH
 (REGULATION 2004)

Time : 3 Hr

Max Marks : 100

ANSWER ALL QUESTIONS
PART A (10 X 2 = 20 Marks)

1. What is the difference between discrete and continuous random variables
2. What is decision tree?
3. Define pure strategy
4. What is value of information?
5. What is state of nature?
6. Differentiate between chance node and decision node in a decision tree
7. Give two examples for Multi channel multi stage Queuing models
8. Define principle of dominance.
9. What is meant by renegeing?
10. In what areas of management Markov processes can be applied successfully?

PART B (16 X 5 = 80 Marks)

11. The annual demand for a product is 48000 units. Demand during lead time follows normal with mean 3700 and std dev 150 units. The cost of ordering is Rs 400 per order. The cost of purchase is Rs 10 per unit. The cost of carrying per unit per year is 15% of the purchase price. Assume service level of 95%. Determine the reorder level.
- 12a. Assume a fruit seller buys fruits for Rs 30 per case and sells them for Rs 80 per case. A 90-day observation for the sales gives the information given below. Assuming the sales will follow the distribution in future, not considering the lost sales due to inadequate stock find out how many cases fruit seller has to buy for tomorrow's sales and the expected profit. Also determine the value of information.

Daily Sales	No of days Sold	Probability
10	18	0.2
11	36	0.4
12	27	0.3
13	9	0.1
	90	1.0

(OR)

- 12b. Write short notes on
 - i. Decision trees
 - ii. AHP

13 a. Solve the following game by graphical method

		B			
		B1	B2	B3	B4
A	A1	3	5	4	0
	A2	7	4	6	7

(OR)

13b. Solve the following game graphically:

	B1	B2
A1	2	4
A2	2	3
A3	3	2
A4	-2	6

14a. Machines arrive for repair at the rate of 6 per hour following poisson. The mechanics mean repair time is 15 minutes, which follows exponential distribution. The down time cost for the broken down machines per hour is Rs 300. Mechanics are paid Rs 60 per hour. Determine the optimal number of mechanics to be employed to minimise the total cost.

(OR)

14b Ship arrive at a port at the rate of one in every four hour (Poisson). The time ship occupies a berth for unloading follows exponential with an average of 10 hours . If the average delay of ships waiting for berths is to be kept below 14 hours, how many berths should be provided at the port?

15a. The two brands (A&B) of a product have equal share in the market and the market size is assumed to be fixed. The transition matrix is as given below :

	To	
From	A	B
A	0.9	0.1
B	0.5	0.5

If the initial market share breakdown is 50% for each brand, determine their market share in steady state.

(OR)

15b. Three dairies D1,D2 & D3 supply milk to a town. Customers switch over from dairy to dairy because of advertising, dissatisfaction etc. The dairies maintain record of number of their customers and for the new customers the dairy from which they are obtained. Following is the flow of customers during a given month.(April)

Dairy	April 1 (Customers)	Gain from			Losses to			May 1 (Customers)
		D1	D2	D3	D1	D2	D3	
D1	200	0	35	25	0	20	20	220
D2	500	20	0	20	35	0	15	490
D3	300	20	15	0	25	20	0	290

Assume the matrix of transaction probabilities remain fairly Stable and that the May market shares are D1 = 22% D2= 49% D3=29%

Determine

- the market share of the dairies on 1 June and 1 July.
- market share in steady state.