

Or

b Solve the following travelling salesman problem:

AP 2 13

	A	B	C	D	E	F
A	∞	5	12	6	4	8
B	6	∞	10	5	4	3
C	8	7	∞	6	3	11
D	5	4	11	∞	5	8
E	5	2	7	8	∞	4
F	6	3	11	5	4	∞

13. a A company is faced four decision alternatives to investments in a capital expansion programme. The following table indicates the outcomes in terms of the rate of returns.

AP 3 13

Decisions	States of Nature		
	N1	N2	N3
D1	17%	15%	8%
D2	18%	16%	9%
D3	21%	14%	9%
D4	19%	12%	10%

If the company has no information regarding the probability of the occurrence of the three states of nature, give the recommended decision for the criteria listed below.

- (i) Maximax criterion
- (ii) Maximin criterion
- (iii) Regret (minimax) criterion
- (iv) Hurwicz criterion with $\infty = 0.75$

Or

- b i For the following payoff matrix for firm A, determine the optimal strategies for both the firms and find the value of the game.

AP 3 6

		Firm B				
Firm A	3	-1	4	6	7	
	-1	8	2	4	12	
	16	8	6	14	12	
	1	11	-4	2	1	

- ii Solve Graphically,

AP 3 7

1	3	-1	4	2	-5
-3	5	6	1	2	0

14. a i Beta industry estimates that it will sell 24,000 units of its product for the forth coming year. The ordering cost is Rs.150 per order and carrying cost per unit per year is 20% of purchase price per unit. The purchase price per unit is Rs.50. find the economic order size, number of orders and time between successive order.

AP 4 6

- ii For product manufactured in a company, the details are as follows: AP 4 7
 $r = 36,000$ units/year $k = 72,000$ units/year. $C_o = \text{Rs.}250$ per set up; $C_c = \text{Rs.}25$ /unit/year. Find the EBQ and cycle time.

Or

- b The following failure rate has been observed for a certain type of light bulbs: AP 4 13

End of Week	0	1	2	3	4	5	6	7	8
Prob of failure to date	0.05	0.13	0.25	0.43	0.68	0.88	0.96	0.96	1.00

The cost of replacing an individual bulb is Rs.2.25. The decision is made to replace all bulbs simultaneously at fixed intervals, also replace individual bulbs as they fail. If the cost of group replacement is 60 paise per bulb and the total number of bulbs is 1000, what is the best interval between group replacements?

15. a The mean arrival rate to a service centre is 3 per hour. The mean service time is found to be 10 minutes per service. Assuming Poisson arrival and exponential service time, find AP 5 13

- (i) Utilization factor for this service facility
- (ii) Probability of 2 units in the system
- (iii) Expected number of units in the Queue
- (iv) Expected time in minutes that a customer has to spend in the system

Or

- b A company manufacturing scooters produces about 100 scooters a day. The probability distribution of production is given below: AP 5 13

Production per day:	96	97	98	99	100	101	102	103	104
Probability:	0.06	0.08	0.11	0.15	0.20	0.15	0.11	0.08	0.06

The finished scooters are transported in a boat which has space for 100 scooters only. Use Monte-Carlo technique to find the average number of scooters waiting in the factory and the average number of empty spaces in the boat.

*PART – C (Marks 1*15 = 15)*

<i>Q.No</i>		<i>Questions</i>	<i>BLT</i>	<i>CO</i>	<i>Marks</i>
16.	a	A manufacturer of Engines is required to purchase 4800 castings per year. The requirement is assumed to be known and fixed. These casting are subjected to quantity discount as follows (i) For less than 500 units = Rs.150 per unit (ii) For 500 or more but less than 750 units = Rs.140 per unit (iii) For 750 or more units = Rs.132 per unit. Monthly holding cost expressed as a percentage value of the units = 2 %. Ordering cost associated with procurement of items is Rs.750 per procurement. Find the optimum purchase quantity per procurement. Or	AN	4	15
	b	Egg contains 6 units of vitamin A per gram and 7 units of vitamin B per gram and cost 12 paise per gram. Milk contains 8 units of vitamin A per gram and 12 units of vitamin B per gram, and costs 20 paise per gram. The daily minimum requirement of vitamin A and vitamin B are 100 units and 120 units respectively. Find the optimal product mix.	AN	1	15