

ID No. _____

- Note : (i) There are 15 blank spaces in all. Write only the most simplified form of the answer in the blank space given for each question. Use usual notation and symbols as and when necessary.
 (ii) Each correct entry carries 2 marks. Overwriting/cutting will carry zero credit.
 (iii) Rough work, if any should be done at the end of answer book provided and finally it should be crossed out.

- Q.1 In two person zero sum game, the solution of the game is based on the principle of getting the
value of the game.
- Q.2 The problem which has 4 variables can be solved using dynamic programming, by dividing the problem into 4³ number of sub-problems.
- Q.3 If the joint pdf of a joint random variable (X, Y) is given by
- $$f_{XY}(x, y) = \begin{cases} 8xy & 0 < x < y < 1 \\ 0 & \text{otherwise} \end{cases}$$
- then, X and Y are (independent/ dependent) dependent variables.
- Q.4 If a company manufactures microwave ovens for which the cumulative distribution function for failure time is $F(t) = \begin{cases} 0, & t < 0 \\ 1 - (1+t)e^{-t}, & t \geq 0 \end{cases}$, then the probability that the microwave oven is working after 5 years $6e^{-5}$ and the mean time to failure for microwave oven is 2 years.
- Q.5 If the system has 's' servers working in parallel and service time of a customer is exponentially distributed with parameter ' μ ' and ' λ ' is mean arrival rate of customers in the system, then the proportion of time when the server is busy is $\frac{\lambda}{\mu s}$.
- Q.6 The activities which will delay the entire project if they get delayed are known as critical activities.

P.T.O.

Q.7 If the distribution of monthly sale for a certain item is as follows:

X	10	11	12	13	14	15	16
f(x)	0.24	0.16	0.15	0.14	0.22	0.04	0.05

the cost of holding inventory is Rs. 35 per unit per month, the cost of shortage is Rs. 70 per month per unit and the purchase cost per unit is Rs. 15, then $F(R^*) \geq \frac{55}{105} = 0.5238$ and $R^* = 12$.

Q.8 If a continuous random variable X, is uniformly distributed over (3,7), then by using the two digits random number 60, the simulated values of random variable X is 5.4.

Q.9 If the following game gives A's pay off.

		Player B	
		B1	B2
Player A	A1	-1	2
	A2	-2	5
	A3	6	36

then optimal strategies for player A is A3,

and the value of the game is 6.

Q.10 In a single period inventory model, the leftover items are sold at a concessional rate of Rs. 50 per item, when handling cost is Rs. 10 per item, then the holding cost (in Rupees) is -40 R3.

Q.11 For a dynamic programming problem

Min $Z = y_1^2 + y_2^2 + y_3^2$ subject to $y_1 + y_2 + y_3 = 24$ and $y_1, y_2, y_3 \geq 0$, the recurrence equation in backward approach for stage 2 in terms of state variable x_2 is

$$f_2(x_2) = \min_{0 \leq y_2 \leq x_2} \{ y_2^2 + (x_2 - y_2)^2 \}$$

and the value of Min Z is equal to 192.

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