Sem VI /CBSGS/Auto/OR/ND-16 Q. P. Code : 562200 20112116

Revised Course (CBGS)

Duration : 03 Hours Marks : 80

Instructions: 1. Question number ONE is compulsory

2. Answer any THREE from the remaining FIVE

3. Use graph paper where ever necessary

Q.1.(a). How v you understand from simplex table that solution is Infeasible, Unbounded and Infinite number f solution. (05)

(b) Solve the following game. Find the strategies of each player and value of game. (05)

Player A	Player B				
	I	II	III	IV	V
I	3	0	6	-1	7
II	-1	5	-2	2	1

(c) Solve the following Assignment problem of four jobs and three men. Time to perform jobs by different men are given. (05)

Men	Job			
	J1	J2	J3	J4
M1	7	5	8	4
M2	5	6	7	4
M3	8	7	9	4

(d) Solve by graphical method (05)

Maximise,

$$Z = 3X_1 + 4X_2$$

S.t.,

$$X_1 - X_2 \geq 0, \; ; \; 2.5X_1 - X_2 \leq -3, \; X_1 \; \& \; X_2 \geq 0$$

Q.2. (a) A company buys 2000 bats annually. A fixed cost of Rs. 50 is incurred each time an order is placed. Inventory carrying cost is estimated at 20 %. Supplier offers a 10 % discount in price per bat of Rs. 100 if order is placed more than or equal to 150 bats at a time. In what order size should the company purchase. (10)

(b) Solve the following transportation problem to minimise total transportation cost. (10)

	A	B	C	Capacity
X	5	1	7	10
Y	6	4	6	80
Z	3	2	5	15
Demand	75	20	50	

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Q.3. (a) What is degeneracy and unbalanced transportation problem ? (03)

(b) What is Traffic intensity and customers in queuing theory ? (03)

(c) What is decision tree in decision making ? (02)

(d) The following data is pertaining to a project with normal time and crash time. (12)

	Normal		Crash	
Jobs	Time (Days)	Cost (Rs)	Time (Days)	Cost (Rs)
1 – 2	8	100	6	200
1 – 3	4	150	2	350
2 – 4	2	50	1	90
2 - 5	10	100	5	400
3 – 4	5	100	1	200
4 – 5	3	80	1	100

(i) If the indirect cost is Rs. 100 per day, find the least cost schedule (Optimum Duration)

(ii) What is the minimum duration

Q.4. (a) Customers arrive at random. Probability of inter arrival time and service time are given as under

Inter Arrival Time (Minutes)	Probability	Service Time (Minutes)	Probability
1	0.1	1.0	15
2	0.2	1.5	20
3	0.3	2.0	25
4	0.3	2.5	30
5	0.1	3.0	10

Estimate the average waiting time and queue length of customer by using seven simulations

Random Number: 5887, 4739, 2328, 6997, 3569, 5587, 6952 (10)

(b) Customers arrive at random with average 4 customers per hour. Service time on an average is 10 minutes. Find (10)

(i) Utilization factor

(ii) Average length of system

(iii)Average length of non empty queue

(iv)Average waiting time of a customer in the queue.

Q.5. (a) For the upcoming season, farmer can plant corn (A1), wheat (A2) or soyabin (A3) or use the land for grazing (A4). The payoff associated with the different actions are influenced by the amount of rain : Heavy rainfall (S1), Moderate rainfall (S2), Light rainfall or draught. The payoff matrix (In thousand Rs.) is estimated as

	S1	S2	S3	S4
A1	- 20	60	30	-5
A2	40	50	35	0
A3	- 50	100	45	-10
A4	12	15	15	10

Find, which crop will be produced using Maximax, Maximin, Laplace and Hurwicz criteria for decision under uncertainty. (10)

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(b) Solve by Big- M method (10)

Minimize,

$Z = 4X1 + X2$

Subject to,

$3X1 + X2 = 3 : 4X1 + 3X2 \geq 6; X1 + 2X2 \leq 4 ; X1, X2 \geq 0$

Q.6. (a) Solve the following game by method of metrices (10)

7	1	7
9	-1	1
5	7	6

(b) Differentiate between PERT & CPM (05)

(c) What is economic interpretation of dual (05)
