TE SEM VI CBGS Nov-Dec-15
Auto - OR 14/12/15
AUTO Sub:- OR

Q.P. Code : 6441

(REVISED COURSE)

(3 Hours) **[Total Marks : 80**

N.B. (1) Question number 1 is compulsory and answer any **three** from the remaining.

(2) Graph paper should be given on demand.

(3) Digits in the right indicate full marks.

Q.1. (a) Write the dual of following LPP

Minimize,

$Z = 2X_1 + 9X_2$

Subject to,

$3X_1 + X_2 \leq 4$; $X_1 + 4X_2 \geq 5$; $X_1 + X_2 = 6$; **(10)**

$X_1, X_2 \geq 0$,

(b) Solve the following game. Find strategies and value of game (10)

Player A	Player B			
	A	B	C	D
P	3	2	4	0
Q	3	4	2	4
R	4	2	4	0
S	0	4	0	8

Q.2. (a) How will you understand from simplex table that solution is Unbounded, Infeasible, Degenerate and Infinite number of solution. (06)

(b) What are the limitations of Game Theory. (04)

(c) Solve the following LPP

Maximize,

$Z = 15X_1 + 17X_2 + 10X_3$

Subject to,

$X_1 + X_2 + 4X_3 \leq 2000$; $2X_1 + X_2 + X_3 \leq 3600$;

$X_1 + 2X_2 + 2X_3 \leq 2400$; $X_1, X_2 \& X_3 \geq 0$ **(10)**

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Q. 3. (a) Solve the following transportation problem to minimize the total transportation cost (10)

Market

Plant	M1	M2	M3	Supply
P1	8	4	10	10
P2	9	7	9	80
P3	6	5	8	15
Demand	75	20	50	

(b) Assign four jobs to four workers on one to one basis to minimize total cost. (10)

Jobs

Worker	A	B	C	D
P	45	40	51	67
Q	57	42	63	55
R	49	52	48	64
S	41	45	60	55

Q.4. (a) The arrival rate of customers at a single window booking counter of a two wheeler agency follows Poisson distribution and the service time follows exponential distribution. The arrival rate and service rate are 25 customers per hour and 35 customers per hour respectively. Find the following.

(i) Utilization of a booking clerk. (10)

(ii) Average number of waiting customers in the queue.

(iii) Average number of waiting customers in the system.

(iv) Average waiting time per customer in the queue.

(v) Average waiting time per customer in the system.

(b) What is Monte Carlo Simulation Technique. How it will be applicable in solving Queuing problem. (10)

Q.5. (a) The time durations and different activities of a project are given in following table (12)

Activity	1-2	1-3	2-6	3-4	3-5	4-6	5-6	5-7	6-7
Duration (Days)	4	6	8	7	4	6	5	19	10

(i) Draw the network diagram and find the critical path.

(ii) Obtain early and late start time of all activities

(iii) Find Total and Free float of all activities.

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(b) An item is produced at the rate of 50 items / day. The demand occurs at the rate of 25 items / day. If set up cost is Rs. 100 per set up and holding cost is Rs. 0.01 per unit of item per day. Assuming shortages are not permitted. Find

(i) EOQ (ii) Cycle time (iii) Total minimum cost (iv) Maximum Inventory (08)

Q.6. (a) Solve the following LPP by Graphical method **(08)**

Maximize,

$$Z = 8X_1 + 16X_2$$

Subject to,

$$X_1 + X_2 \leq 200 ; 3X_1 + 6X_2 \leq 900 ; \quad X_2 \leq 125 ; \qquad (08)$$

$$X_1, X_2 \geq 0 ,$$

(b) What is safety stock, lead time & Reorder level in Inventory? **(06)**

(c) What are the different approaches for decisions under uncertainty? **(06)**