C.U.SHAH SCIENCE COLLEGE, AHMEDABAD

SEMESTER-V, MATHEMATICS

INTERNAL EXAMINATION, OCT., 2016

MAT-304

DATE:-19/10/2016

TIME:-1.45 Hour
Marks:50

Q-1   Attempt any **ONE**:-
(a)   Prove that the intersection of two convex set is a convex set.
(b)   A firm manufactures headache pills in two sizes A and B. Size A contains 2 grain of aspirin, 5 grain of bicarbonate and 1 grain of codeine. Size B contains 1 grain of aspirin, 8 grain of bicarbonate and6 grain of codeine. It is found by users that it requires at least 12 grains of aspirin, 74 grains of bicarbonate and 24 grain of codeine for providing immediate effect. It is required to determine the least number of pills a patient should take to get immediate relief. Formulate the problem as a standard LPP.

Q-2   Attempt any **ONE**:-
(a)   Explain Gomory's cutting plane method to find integer solution of the LPP.
(b)   Explain Two Phase Simplex method for solving linear programming problem.

Q-3   Attempt any **ONE**:-
(a)   Explain concept of duality (i.e. primal-dual pair). Prove that dual of the dual is primal.
(b)   Using Duality to solve the following Linear Programming Problem.

Max $Z = 3x_1 + 2x_2$

S. to C. $2x_1 + x_2 \leq 5$; $x_1 + x_2 \leq 3$; $x_1, x_2 \geq 0$

Q-4   Attempt any **ONE**:-
(a)   Prove that transportation problem has a triangular basis.
(b)   A product is manufactured by four factories A,B,C and D. The unit production costs in them are Rs. 2, Rs. 3, Rs. 1 and Rs. 5 respectively. Their production capacities are 50,70,30 and 50 units respectively. These factories supply the product to four stores, demands of which are 25,35,105 and 20 units respectively. Unit transportation cost in rupees from each factory to each store is given in the table below.

<div align="center">Stores</div>

Factories		1	2	3	4
	A	2	4	6	11
	B	10	8	7	5
	C	13	3	9	12
	D	4	6	8	3

Determine the extent of deliveries from each of the factories to each of the stores so that the total production and transportation cost is minimum.

Q-5   Answer in **Short**:
1.   Define slack and surplus variable.
2.   When in Big-M method does not possess any feasible solution ?
3.   When we say that given LPP does not possess optimum solution ?
4.   Give one advantage of duality.
5.   Define degenerate solution and artificial variable for given LPP.

--------X-X-X-X---------