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JAYPEE UNIVERSITY OF INFORMATRION TECHNOLOGY, WAKNAGHAT
TEST -3 EXAMINATION- DECEMBER-2017
B.Tech VIIth Semester (All Branches)

COURSE CODE: 10B1WMA731 MAX. MARKS: 35
COURSE NAME: Optimization Techniques
COURSE CREDITS: 03 MAX. TIME: 2 Hr

Note: All questions are compulsory. Marks are indicated in square bracket against each question. Carrying of mobile phone during examinations will be treated as case of unfair means.

Q1.A firm plan to purchase at least 200 quintals of scrap containing high quality metal X and low quality metal Y.It decides that the scrap to be purchased must contain at least 100 quintals of X metal and not more than 35 quintals of Y metal. The firm can purchase the scrap from two suppliers A and B in unlimited quantities. The percentage of X and Y metals in terms of weight in the scraps supplied by A and B is given below:

Metals	Supplier A	Supplier B
X	25 %	75%
Y	10 %	20%

The price of A's scrap is Rs.200 per quintal and that of B's is Rs.400 per quintal. Formulate the problem as LPP in order to minimize total purchase cost. Also solve the problem graphically. [6]

Q2.Write the dual of $Max\ Z = 40x_1 + 50x_2$

s/t $2x_1 + 3x_2 \leq 3\ , 8x_1 + 4x_2 \leq 5\ and\ x_1, x_2 \geq 0$

Also find the solution of primal problem from the solution of dual. [6]

Q3.Solve the transportation problem [5]

Origin/Destination	D1	D2	D3	D4	D5	D6	Available
A	5	3	7	3	8	5	3
B	5	6	12	5	7	11	4
C	2	1	3	4	8	2	2
D	9	6	10	5	10	9	8
Required	3	3	6	2	1	2	

Q4. Solve using Gomory's method.

$$Max\ Z = 11x_1 + 4x_2$$

s/t $-x_1 + 2x_2 \leq 4\ ,\ 5x_1 + 2x_2 \leq 16\ ,\ 2x_1 - x_2 \leq 4$

$x_1, x_2 \geq 0\ and\ Integers$ [6]

Q5.Solve the NLPP $Max\ Z = 10x_1 - {x_1}^2 + 10x_2 - {x_2}^2$

s/t $x_1 + x_2 \leq 14\ , -x_1 + x_2 \leq 6\ and\ x_1, x_2 \geq 0$ [6]

Q6.Solve the NLPP $Max\ Z = 4{x_1}^2 + 2{x_2}^2 + {x_3}^2 - 4x_1x_2$

s/t $x_1 + x_2 + x_3 = 15\ , 2x_1 - x_2 + 2x_3 = 20\ and\ x_1, x_2, x_3 \geq 0$ [6]