PARUL UNIVERSITY
FACULTY OF ENGINEERING & TECHNOLOGY
M.Tech., Summer 2017 - 18 Examination

Semester: 2   Date: 23/05/2018
Subject Code: 03203153   Time: 02:00 pm to 04:30 pm
Subject Name: Optimization Techniques in Electrical Engg   Total Marks: 60

Instructions:
1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.

Q.1 A) Give brief introduction to Linear Programming.   **(05)**

B) A company produces two products A and B which possess raw materials 400 quintals and 450   **(05)**
labour hours. It is known that 1 unit of product A requires 5 quintals of raw materials and 10
man hours and yields a profit of Rs 45. Product B requires 20 quintals of raw materials, 15
man hours and yields a profit of Rs 80. Formulate the LPP.

C) A firm manufactures 3 products A, B and C. The profits are Rs. 3, Rs. 2 and Rs. 4 respectively. The   **(05)**
firm has 2 machines and below is given the required processing time in minutes for each machine
on each product.

Machine	Product		
	A	B	C
X	4	3	5
Y	2	2	4

Machine X and Y have 2000 and 2500 machine minutes. The firm must manufacture 100 A's, 200
B's and 50 C's type, but not more than 150 A's.

Q.2 Answer the following questions. (Attempt any three) (Each five mark)   **(15)**

A) Give brief introduction to Linear Programming.

B) Write Graphical Solution Procedure.

C) A company produces two products A and B which possess raw materials 400 quintals and 450
labour hours. It is known that 1 unit of product A requires 5 quintals of raw materials and 10
man hours and yields a profit of Rs 45. Product B requires 20 quintals of raw materials, 15
man hours and yields a profit of Rs 80. Formulate the LPP.

D) Solve graphically
   $2x + 4y > 12$

Q.3 A) A company owns 2 oil mills A and B which have different production capacities for low, high and   **(07)**
medium grade oil. The company enters into a contract to supply oil to a firm every week with 12, 8,
24 barrels of each grade respectively. It costs the company Rs 1000 and Rs 800 per day to run the
mills A and B. On a day A produces 6, 2, 4 barrels of each grade and B produces
2, 2, 12 barrels of each grade. Formulate an LPP to determine number of days per week each mill
will be operated in order to meet the contract economically.

B) Solve by simplex method   **(08)**
   Maximize $Z = 5x_1 + 7x_2$
   Subject to $x_1 + x_2 \leq 4$
                       $3x_1 - 8x_2 \leq 24$
                       $10x_1 + 7x_2 \leq 35$ and $x_1 \geq 0, x_2 \geq 0$

B) Write the Standard LPP (SLPP) of the following **(08)**
   Minimize Z = x1 + 2 x2 + 3x3
   Subject to
              2x1 + 3x2 + 3x3 ≥ – 4
              3x1 + 5x2 + 2x3 ≤ 7
   and x1 ≥ 0, x2 ≥ 0, x3 is unrestricted in sign

Q.4 A) List important characteristics of Duality **(07)**

A) Explain Fibonacci Section Search **(07)**
B) Explain Golden Section Search **(08)**