CODE NO: NR 310206 NR

2006 JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY

III B.TECH I SEMESTER SUPPLEMENTARY EXAMINATIONS
OPTIMIZATION TECHANIQUES
(ELECTRICAL& ELECTRONIC ENGINEERING)

NOVEMBER 2006

TIME - 3 HOUR
MARK – 80

Answer any FIVE Questions
All Questions carry equal marks

1. (a) Determine the maximum and minimum values of the function: [8] 12x5-45x4+40x3+5

(b) A d.c. generator has internal resistance of R ohms and develops an open circuit voltage of ‘V’ volts. Find the value of load resistance ‘r’ for which the power developed by the generator will be maximum. [10]

2. (a) State and explain the necessary and sufficient conditions for existence of relative optima in case of multivariable optimization with constraints. [10]

(b) Find the dimensions of a rectangular parallelepiped with largest volume whose sides are parallel to the coordinate planes, to be inscribed in the ellipsoid. 8]

3. (a) State and explain the standard form of LPP. [6]

(b) Explain the significance of slack, surplus and artificial variables of LPP. [10]

4. Show that the following LPP has unbounded solution [16]

maximize Z = 3x1 + 2x2 subject to x1 - x2 1 3x1 - 2x2 6 x1, x2 0
5. (a) If Pall the sources are emptied and all the destinations are filled, show that ai = P bj is a necessary and sufficient condition for the existence of a feasible solution to a transportation problem

(b) Prove that there are only m+n-1 independent equations in a transportation problem, m and n being the no. of origins and destinations and that any one equation can be dropped as the redundant equation.
[8+8]

6. Draw the flowchart of Powell’s method. Explain about each block. [16]

7. Consider the problem:
Minimize f(x1, x2) = (x1 - 1)2 + (x2 - 2)2 Subject to 2x1 - x2 = 0
and x1 10 Construct -K function according to the interior penalty function approach and complete the minimization of -K. [16]

8. Determine the value of u1, u2, u3 so as to maximize (u1.u2.u3) , Subject to, u1 + u2 + u3 = 10 and u1, u2, u3 0
[16]