Code No: NR410101 **NR**

IV B.Tech I Semester Supplementary Examinations, April/May 2005
COMPUTER AIDED ANALYSIS
(Civil Engineering)

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. What are the various benefits of Computer Aided Design?
2. With neat sketch explain raster scan technique of image generation in computer graphics.
3. Write about the following with examples.
   (a) Translation
   (b) Rotation
   (c) Scaling.
4. (a) Write down the transformation matrix for the stress resultants in the local coordinate system to the global coordinate system for a plane frame member.
   (b) Explain how the overall joint stiffness matrix is obtained and indicate the use of the various sub matrices in the overall joint stiffness matrix.
5. Derive expressions for first order, second order, third order and fourth order differentiations expressions using concepts of finite difference method.
6. Explain procedure for solution of settlement under a raft foundation using finite difference method. Discuss the effect of closely spaced pivotal points.
7. (a) Prove the theorem "Any local minimum solution is global for a linear programming problem"
   (b) A farmer has 100 acre farm. He can sell all tomatoes, lettuce or radishes he can raise. The price he can obtain is Re 1/- per kg for tomatoes, Rs. 0.75/- a head for lettuce and Rs 2/- per Kg for radishes. The average yield per acre is 2000 Kg of tomatoes, 3000 heads of lettuce and 1000 Kgs of radishes. Fertilizer is available at Rs 0.50 per Kg and the amount required per acre is 100 Kgs each for tomatoes and lettuce and 50 Kgs for radishes. Labour required for sowing, cultivating and harvesting per acre is 5 man-days for tomatoes and radishes, and 6 man-days for lettuce. A total of 400 man-days of labour are available at Rs 20/- per man-day. Formulate this problem as a linear programming model to maximize the farmers total profit.
8. (a) Prove the following theorem.
   If both primal and dual problems have feasible solutions, then both have optional solutions and minimum f = maximum v.

(b) construct the dual of the primal problem

Maximize $z = 2x_1 + x_2 + x_3$

Subject to $x_1 + x_2 + x_3 \geq 6$

$3x_1 - 2x_2 + 3x_3 = 3$

$-4x_1 + 3x_2 - 6x_3 = 1$

$x_1, x_2, x_3 \geq 0.$

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