Code No: RR410101 **Set No.1**

IV B.Tech. I Semester Regular Examinations, November -2005
COMPUTER AIDED ANALYSIS & DESIGN
(Civil Engineering)

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

Answer any FIVE Questions
All Questions carry equal marks

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1. Explain concepts of engineering analysis in computer aided system. [16]
2. Explain various features of computer modelling. [16]
3. Explain software configuration of a graphic system. [16]
4. Write short notes on the following: [4 × 4 = 16]
   (a) Member stiffness and structure stiffness
   (b) Transformation matrix
   (c) Equivalent joint loads
   (d) Degrees of freedom
5. (a) Explain pivotal distance and its significance. Explain with suitable examples its influence on the final solution. [6]
   (b) Derive general expression for second order difference terms with unequal spaced pivotal points. [10]
6. Explain the procedure for solution of settlement under a raft foundation using finite differnece method. Discuss the effect of closely spaced pivotal points. [16]
7. Maximize $F = x_1+2x_2+x_3$ subject to
   $2x_1+x_2-x_3 \leq 2$, $-2x_1+x_2-5x_3 \geq -6$
   $4x_1+x_2+x_3 \leq 6$, $x_i \geq 0$, i = 1,2,3. [16]
8. Solve the following simple linear programming problem by Revised simplex method.
   Maximize $z = 2x_1+x_2$
   Subject to $3x_1+4x_2 \leq 6$
   $6x_1+x_2 \leq 3$,
   $x_1, x_2 \geq 0$. [16]

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Code No: RR410101 **Set No.2**

IV B.Tech. I Semester Regular Examinations, November -2005
COMPUTER AIDED ANALYSIS & DESIGN
(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? [16]
2. What are the various hardware features of Computer Aided Design system? [16]
3. Explain software configuration of a graphic system. [16]
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 members. [8]
   (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. [8]
5. Explain with govering differential equations various applications which can be solved using finite difference method. [16]
6. Explain the procedure for solution of settlement under a raft foundation using finite differnece method. Discuss the effect of closely spaced pivotal points. [16]
7. Minimize $f = -3x_1-2x_2$ subject to
   $x_1-x_2 \leq 1$, $3x_1-2x_2 \leq 6$, $x_1 \geq 0, x_2 \geq 0$. [16]
8. Solve by the revised simplex method.
   Maximize $z = 6x_1-2x_2+3x_3$
   Subject to $2x_1-x_2+2x_3 \leq 2$
   $x_1+4x_3 \leq 4$, $x_1, x_2, x_3 \leq 0$. [16]

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Code No: RR410101 **Set No.3**

IV B.Tech. I Semester Regular Examinations, November -2005
COMPUTER AIDED ANALYSIS & DESIGN
(Civil Engineering)

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

Answer any FIVE Questions
All Questions carry equal marks

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1. Explain typical features of a central processing unit used in Computer Aided Design. [16]

2. Explain tyical configuration of hardware components in stand-alone Computer Aided Design system. [16]

3. A point in two dimensions is located at (3, 4). It is desired to relocate the point by means of rotation and scaling transformations only (no translation) to a new position defined by (0,8).
   (a) Describe the sequence of transformations requried to accomplish the movement of line as specified.
   (b) Write transformation matrix for each step in the sequence.
   (c) Write concatenation transformation matrix for the sequence. [8+4+4]

4. Three wires OA, OB and OC in one plane are hinged at the ends A, B and C and are pin connected at O. Wires OA and OC are inclined to the vertical at 30^0 and OB is vertical. Length OB = 1.5 m. The three wires jointly support a load of 120 kN at O. The area of cross section of wire OA is 4 mm^2, that of OB is 6 mm^2 and of OC is 8 mm^2. If E is constant, determine the forces in the wires using stiffness matrix approach. [16]

5. Exlain the effect of boundary conditions and their influence on the deflected shape of the beam. [16]

6. Explain the procedure for solution of settlement under a raft foundation using finite differnece method. Discuss the effect of closely spaced pivotal points. [16]

7. Minimize f = $-40x_1-100x_2$ subject to
   $10x_1+5x_2 \leq 2500$, $4x_1+10x_2 \leq 2000$,
   $2x_1+3x_2 \leq 900$, $x_1 \geq 0$, $x_2 \geq 0$. [16]

8. (a) What are the advantages of Revised simplex method over the Standard simplex method. [6]
   (b) Apply the principle of duality to solve the L.P. problem.
   Maximize $z = 3x_1-2x_2$
   Subject to the constraints $x_1+x_2 \leq 5$, $x_1 \leq 4$
   $1 \leq x_2 \leq 6$, $x_1, x_2 \geq 0$. [10]

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Code No: RR410101 **Set No.4**

IV B.Tech. I Semester Regular Examinations, November -2005
COMPUTER AIDED ANALYSIS & DESIGN
(Civil Engineering)

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

Answer any FIVE Questions
All Questions carry equal marks

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1. Describe some common editing features available in Computer Aided Design system. [16]
2. Explain the features of workstation used for Compuer Aided Design. [16]
3. A line is defined by its end points (0, 0) and (2, 3) in a two dimensional graphics system. It is desired to move this line by means of series of transformation so that its end points will be at (0, 1) and (0, 5).
   (a) Describe the sequence of transformations required to accomplish the movement of line as specified.
   (b) Write transformation matrix for each step in the sequence.
   (c) Write concatenation transformation matrix for the sequence. [16]
4. A rigid portal frame ABC is fixed at A and hinged at C. Member AB is horizontal and is 4 m long. Its moment of Inertia is 2I. Member BC is vertical and 5 m high. Its moment of inertia is 3I. Generate the stiffness matrix of the frame considering the unknowns at B and C. [16]
5. Derive expressions for governing boundary conditions to be incorporated in differential equation terms of a beam with
   (a) Fixed boundary
   (b) Simply supported
   (c) Free end. [16]
6. Explain the procedure for solution of settlement under a raft foundation using finite differnece method. Discuss the effect of closely spaced pivotal points. [16]
7. Minimize f = $2x_1+3x_2+2x_3-x_4+x_5$ subject to the constraints
   $3x_1-3x_2+4x_3+2x_4-x_5 = 0$
   $x_1+x_2+x_3+3x_4+x_5 = 2$
   and $x_i \geq 0$, i=1 to 5. Use two-phase simplex method. [16]
8. Given the linear programming problem :
   Maximize z = $3x_1+5x_2$
   Subject to the constraints $3x_1+2x_2 \leq 18$, $x_1 \leq 4$
   $x_2 \leq 6$, x_1, $x_2 \geq 0$.

(a) Determine an optimum solution to the L.P. problem

(b) Discuss the effect on the optimality of the solution when the objective function is changed to $z = 3x_1+x_2$. [8+8]

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