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BICEE-021

B.Tech. CIVIL ENGINEERING (BTCLEVI)

Term-End Examination

June, 2018

00733

BICEE-021 : COMPUTATIONAL METHODS IN STRUCTURAL ENGINEERING

Time : 3 hours *Maximum Marks : 70*

Note : *Attempt any **five** questions. All questions carry equal marks. Use of scientific calculator is permitted.*

1. (a) Discuss the difference between exterior and interior penalty functions in constrained optimization. *8*

(b) Describe application of geometric programming in structural analysis. *6*

2. (a) Convert to following primal equations into dual equations : *7*

Maximize $z = 10x_1 + 3x_2$

subject to,

$$x_1 + 2x_2 \geq 6$$

$$-x_1 + 4x_2 \geq 10$$

$$x_1, x_2 \geq 0$$

(b) If sensitivity analysis is to be done with respect to the changes in objective functions of linear programming, what assumptions and steps would be followed ? 7

3. Determine the forces in members of the truss shown in Figure 1. 14

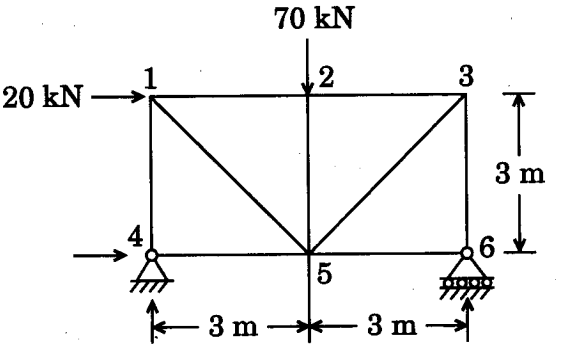

Figure 1

4. Analyse a simply supported beam subjected to a concentrated load P at the center for its end slopes and deflection at the center as shown in Figure 2. 14

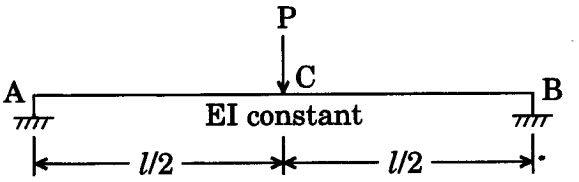

Figure 2

5. Illustrate the force method for the analysis of rigid plane frame in detail, with steps. *14*

6. Write short notes on the following : *7+7=14*

   (a) Cholesky Method

   (b) Gauss Elimination Method

7. (a) Discuss the application of First Element method. *5*

   (b) Describe any one method used in integer programming. *5*

   (c) What is second order of optimization ? *4*
