What is Isoparametric representation ?

 Define Shape function?

 Write down the expression for transverse vibration of beam element ?

 What do you mean by amplitude of vibration ?

 Write about damping effect in vibration ?

What is two dimensional elements explain with some sketches ?

 What is CST Element?

 What is Geometric isotropy or spatial isotropy or Geometric invariance ?

What do you mean by amplitude of vibration ?

 Write about damping effect in vibration ?

. State how the types of vibrations are classified and explain.

. Write natural frequency of vibration or equation of motion for undamped free vibration of an element

What is Plane stress and Plane strain ?

 Write Displacement function equation for CST element ?

 Write down the expression of longitudinal vibration of bar ement ?

 What do you mean by transverse vibrations ?

How the two dimensional elements are defined ?

 What is QST element ?

Write down the stiffness matrix equation for two dimentional CST element ?

 What is Plane stress and Plane strain ?

 Write Displacement function equation for CST element ?

Write down the expression of governing equation for free axial vibration of rod ?

 State the difference between direct and iterative method of solving the system of equation.

 Show that the matrix A = { cosθ sinθ }

 {-sinθ cosθ } is orthogonal.

A ) Find the eigen values and eigen vectors of { 4 -20 -10

 -2 10 4

 6 -30 -13 }

B) Integrate the function f(r) = 1 + r + r2 + r3gu between the limits -1 and +1 using

 1. exact method

 2. Gauss Integration method and compare the two results.

C) Derive the stiffness matrix for two dimensional CST element and temperature effect in CST element.

 D) The (x,y) co-ordinates of nodes i,j and k of an axisymmetric triangular element are given by(3,4),

 (6,5) and (5,8) cm respectively .The element (in cm) vector is given as q = *[0.002, 0.001, 0.004, - 0.004, 0.007 ]t* Determine the element strains. r3z3 **3(5,8)**

 **(3,4)1 2(6,5)**

 r1z1 r2z2

 1) For the constant strain triangular element shown in figure 1) Assemble strain displacement matrix

 **Take E = 2 x 105 N/mm2 and t = 20 mm Y K(200,400)**

 **I(100,100) J(400,100)**

 **X**

2) Determine the Cartesian coordinates of the point P which has local coordinates ε = 0.8 and η = 0.6 as

 Shown in figure η 3 **(8,12)** ε

 (ε,η) P

 **(5,10)** 4 2 **(9,6)**

 **1 (3,4)**

3) Determine the eigen values and natural frequencies of a system whose stiffness and mass

 matrices are given below

 *[ K ] =* 2AE [ 3 -1 ] and **m**  = ρAL [ 6 1 ]

 L [ -1 1 ] 12 [ 1 2 ]

4) Find the natural frequencies of longitudinal vibration of the unconstrained stepped bar for shown in

 the figure. A 1 = 2AA 2 = A

 1 U1 1 2U2 2 3U3

 **x** L(1)= L/2 L(2) )= L/2

 **( Stepped bar with axial degree of freedom )**