YEAR 1^{ST} SEM 1^{ST} OLE

FEM

1. For a 2D body, the stresses, strains with initial strain are related as :->$\sigma = D(\varepsilon - \ )$
2. From the theory of mechanics of solids, for plane stress conditions the initial strain, can be written as :->
3. What is the size of the element body force vector, f^e of a 2D element? :->**6X1**
4. Which of the following represents the 2D element Stiffness matrix K^e :->**$t_e A_e B^T DB$**
5. In a 2D element, what is the size of the element strain displacement matrix ? :->**3X6**
6. From the knowledge of area of triangle, what is the value of detJ in terms of area of the triangle? :->**twice the area of the triangle**
7. For a 2D element, what is det J when J is denoted as the Jacobian of the transformation? :->
8. What is the Jacobian matrix size of a basic linear 2D element? :->**2X2**
9. In a 2D element, N_2=0.25, N_3 = 0.3 what is the value of N_1 :->**0.45**
10. In a 2D element, N_1=0.3, N_2 = 0.2 what is the value of N_3 :->**0.5**
11. What is the size of the shape function matrix N, of a 2D element? :->**2X6**
12. In a 2D element, the shape functions can be physically represented by area coordinates. A point in a triangle divides it into three areas, . The shape N_1 is represented as :->**A_1/A**
13. In a 2D element, what is the value of summation of all the shape functions at every point inside the triangle? :->**1**
14. In a 2D element, the value of shape function N2 at node 1 is :->**zero**
15. In a 2D element, the value of shape function N1 at node 1 is :->**1**
16. The number of shape functions in a 2D element is :->**3**
17. In a 2D problem, for the constant strain triangle, the shape functions varies over the element as :->**Linear**
18. The element displacement vector for a 2D element is :->**$q = [q_1, q_2, q_3, q_4, q_5, q_6]^T$**
19. The number of nodes present in a basic 2D linear element is :->3
20. In a 2D problem, what is the degree of freedom of each node? :->2
21. In a 2D problem, the basic 2D element is :->**triangle**
22. In a 2D problem, the stress-strain relationship is represented as :->**$\sigma = D\,\varepsilon$**
23. In a 2D problem, the shear strain in XY direction is given as :->**(du/dy + dv/dx)**
24. In a 2D body, the elemental volume (dv) is given as :->**tdA**
25. In a 2D problem, the strain and its components are given as :->ε =
26. In a 2D problem, the stress and its components are given as :->σ =
27. In a 2D problem, the displacement vector is given as :->**u=[u,v]T**
28. What is the size of the element stiffness matrix Ke of a beam element? :->**4X4**
29. The total number of shape functions in a hermite shape function are :->**4**
30. In a beam element, the hermite shape function is represented by an expression of order :->**cubic order**
31. In a beam element, the element displacement vector is :->**q= [q_1, q_2 , q_3,q_4]T**
32. In a beam element, what is the degree of freedom of each node? :->**2**
33. As per the elementary beam theory, the relationship between σ, M and I is :->**σ x I = -M.y**
34. What do you mean by a Beam :->**Slender member used for supporting transverse loading**
35. In a quadratic element, what is the size of element body force vector, fe :->**3 x 1**
36. In a quadratic element, what is the size of element Traction force vector, Te :->**3 x 1**
37. In a quadratic element, what is the size of element stiffness matrix, K :->**3 x 3**
38. In a quadratic element, what is the size of element displacement vector, q :->**3 x 1**
39. In a quadratic element, what is the size of shape function matrix , N :->**1 x 3**
40. In a quadratic element, the quadratic shape function 'N_3' is denoted as :->**$(1+\xi)(1-\xi)$**
41. In a quadratic element, the quadratic shape function 'N_2' is denoted as :->

42. In a quadratic element, the quadratic shape function 'N1' is denoted as :-> $\xi(1-\xi)$
43. In a quadratic element, what is the value of ξ at node 3 :->0
44. In a quadratic element, what is the value of ξ at node 2 :->1
45. In a quadratic element, what is the value of ξ at node 1 :->-1
46. In a quadratic element, what is the element displacement vector 'q' :->q=[q_1,q_2,q_3]T
47. In a quadratic element what is the internal node :->3
48. What is the value of deformation at fixed end of a cantilever beam when it is subjected to point load at free end. :->ZERO
49. For linear one dimensional problem, what is the size of the global stiffness matrix when 'N' denotes the number nodes? :->N x N
50. In a ID problem, what is the value of integral of a shape function :->1
51. In a ID problem, the element traction force vector , Te, is given as :->
52. In a ID problem, the element body force vector , fe, is denoted as :->
53. In a ID problem, what is the size of the element stiffness matrix , K :->2 x 2
54. In a ID problem, what is the relationship between ε, B and q. :->ε=Bq
55. In a ID problem, what is the size of the element strain-displacement matrix, B is :->1 x 2
56. In a ID problem, the isoparametric formulation in terms of N_1 and N_2 as :->x=
57. In a ID problem, the element displacement vector q is denoted as :->q=[q_1, q_2]T
58. In a ID problem, the shape function matrix 'N' is denoted as :->N=[ ]
59. In a ID problem, the linear displacement field within the element can be written in terms of the nodal displacements q_1 and q_2 in matrix notation as :->u=Nq
60. In a ID problem, the linear displacement field within the element can be written in terms of the nodal displacements q_1 and q_2 as :->
61. In a ID problem, the linear shape function N_2, is denoted as :->$(1+\xi)/2$
62. In a ID problem, the linear shape function N_1, is denoted as :->$(1-\xi)/2$
63. In a ID problem, the length of an element is covered when natural coordinate,ξ changes from :->-1 to 1
64. What do you mean by element connectivity in a finite element modeling? :->It establishes local-global correspondence
65. In a ID problem stepped bar with 4 steps is discredited into 4 linear elements then what are the number of nodes present in the problem :->5
66. In a ID problem, stepped bar with 3 steps is discredited into 3 linear elements then what are the number of nodes present in the problem :->4
67. In a ID problem, stepped bar with 2 steps is discredited into 2 linear elements then what are the number of nodes present in the problem :->3
68. In a ID problem, what is the degree of freedom (dof) of each node :->1
69. For ID problems, the differential volume dv can be written as :->Adx
70. What is the nature of stress-strain curve of a cast iron material? :->a straight line
71. For linear elastic materials, the strain energy per unit volume in the body is :->
72. Under plane strain condition the strain by its components is represented as :->ε = [
73. Under plane stress condition the stress by its components is represented as :->σ = [
74. The surface traction acting on a 3D body is represented by its components as :->T = [T_x, T_y , T_z]T
75. Distributed force acting on a 3D body is represented as :->f = [f_x, f_y , f_z]T
76. A load 'p' acting at a point 'i' is represented by its three components as :-> P_i = [P_x ,P_y ,P_z]_iT
77. What is the size of material matrix of a 2D body? :->3X3
78. What is the size of material matrix of a 3D body? :->6X6
79. What is the engineering shear strain of a 3D body in YZ direction? :->dv/dz + dw/dy
80. What is the engineering shear strain of a 3D body in XZ direction? :->du/dz + dw/dx
81. What is the engineering shear strain of a 3D body in XY direction? :->du/dy +dv/dx
82. How 2D problems are modeled :->Modeled as plane stress and plane strain
83. What is a shear strain? :->Ratio of shear stress and shear modulus
84. What are the units for the coefficient of linear expansion? :->per deg C
85. Which one of the following refers to the isotropic materials? :->Material properties are constant in all directions
86. How do you define a stress? :->Force per unit area
87. What is the traction force of a 1D body? :->force per unit length
88. What is the traction force of a 2D body? :->Force per unit area
89. What is the Body Force? :->force per unit volume
90. In a plane strain condition :->Strains in Z-direction are zero

92. What is the Poisson's ratio? :->**The ratio of lateral strain to longitudinal strain**
93. What is the potential energy of an elastic body? :->**Strain energy + work potential**
94. When do you say that a problem is plane-strain problem? :->**If a long body of uniform cross section is subjected to transverse loading along its length.**
95. When do you say that a problem is plane-stress problem? :->**If a thin planar body subjected to in-plane loading on its edge surface.**
96. In a 1D body what is the relationship between stress and strain :->
97. In a 2D body what is the relationship between stress and strain :->
98. In a 3D body what is the relationship between stress and strain :->
99. What is the relationship between modulus of rigidity and modulus of elasticity in terms of Poisson's ratio? :->**E= 2G (1+v)**
100. In a 3D body what is the strain-displacement relationship in Z-direction? :->**dw/αz**
101. In a 3D body what is the strain-displacement relationship in Y-direction? :->**dv/αy**
102. In a 3D body what is the strain-displacement relationship in X-direction? :->**du/dx**
103. What are the three shear stresses in a 3D element? :->
104. In a 3D body what are the three normal stresses along the coordinate axis? :->