Program: BE Mechanical Engineering

Curriculum Scheme: Revised 2016

Examination: Third Year Semester VI

Course Code: MEC603 and Course Name: Finite Element Analysis

Time: 1-hour   Max. Marks: 50

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Note to the students:- All the Questions are compulsory and carry equal marks .

Q1.	**1 Example of 2-D Element is ___________ .**
Option A:	bar
Option B:	triangle
Option C:	hexahedron
Option D:	tetrahedron
Q2.	**The number of shape functions will be equal to the number of**
Option A:	nodes of element
Option B:	elements of the structure
Option C:	size of the structure
Option D:	coordinates
Q3.	**How many nodes are in 3-D brick element**
Option A:	3
Option B:	6
Option C:	5
Option D:	8
Q4.	**The first book on Finite Element Methods were written and published in 1967**
Option A:	Wolowitz and Cooper
Option B:	Farrahfowler and Hofstader
Option C:	Bing and Geller
Option D:	Zienkiewicz and Chung
Q5.	**Condition of a system that fluctuate with time is called as**
Option A:	Transverse State Condition
Option B:	Transient State Condition
Option C:	Transistent State Condition
Option D:	Transgressive State Condition
Q6.	**The mathematical process of dividing a domain into a number of subdomains**

	of finite length is called as
Option A:	Cutting
Option B:	Mincing
Option C:	Discrete Icing
Option D:	Discretizing
Q7.	**The dependent variable of a differential equation is known as**
Option A:	pre primary variable
Option B:	primary variable
Option C:	secondary variable
Option D:	higher secondary variable
Q8.	**For thermal analysis, the field variable is __________.**
Option A:	stress
Option B:	strain
Option C:	displacement
Option D:	temperature
Q9.	**Finite element analysis deals with**
Option A:	Approximate numerical solutions
Option B:	Non boundary value problems
Option C:	Partial Differential equations
Option D:	Differential equations
Q10.	**The shape function has.........value at one nodal point and.........value at other nodal point**
Option A:	unity, negative
Option B:	positive, negative
Option C:	unity, zero
Option D:	high, low
Q11.	**The nature of loading at various locations and other surfaces conditions called**
Option A:	boundary condition
Option B:	traction
Option C:	friction
Option D:	surfacing
Q12.	**Axis-Symmetric element is______________Element**
Option A:	1D
Option B:	2D
Option C:	3D
Option D:	4D
Q13.	**A small unit having definite shape of geometry and node is known as**

Option A:	Discrete element
Option B:	finite element
Option C:	assembled element
Option D:	Infinite element
Q14.	**Sum of all shape functions is equal to**
Option A:	Zero
Option B:	-1
Option C:	+1
Option D:	2
Q15.	**Which of the following can be used to identify distinct nodes**
Option A:	Change of Geometry
Option B:	Change of color
Option C:	Change of resistance
Option D:	No change
Q16.	**Which of the following is associated with the value of weight function in Petrov Galerkin Method to solve for the numerical solution of a differential equation**
Option A:	Any algebraic polynomial
Option B:	Any quadratic polynomial
Option C:	Any differential polynomial
Option D:	Any parabolic polynomial
Q17.	**If the number of nodes used for defining the geometry is more than the number of nodes used for defining the displacements, then it is known**
Option A:	Sub Parametric elements
Option B:	Iso Parametric elements
Option C:	Super Parametric elements
Option D:	Meta Parametric Elements
Q18.	**The element matrix equation for analysis of a bar under axial loading is given by**
Option A:	$\frac{EA}{h_e}\begin{bmatrix}-1 & 0\\ 0 & -1\end{bmatrix}\begin{bmatrix}u_1^e\\ u_2^e\end{bmatrix}=\begin{bmatrix}P_1^e\\ P_2^e\end{bmatrix}$
Option B:	$\frac{EA}{h_e}\begin{bmatrix}-1 & 1\\ 1 & -1\end{bmatrix}\begin{bmatrix}u_1^e\\ u_2^e\end{bmatrix}=\begin{bmatrix}P_1^e\\ P_2^e\end{bmatrix}$
Option C:	$\frac{EA}{h_e}\begin{bmatrix}1 & -1\\ -1 & 1\end{bmatrix}\begin{bmatrix}u_1^e\\ u_2^e\end{bmatrix}=\begin{bmatrix}P_1^e\\ P_2^e\end{bmatrix}$
Option D:	$\frac{EA}{h_e}\begin{bmatrix}-1 & 0\\ 0 & -1\end{bmatrix}\begin{bmatrix}P_1^e\\ P_2^e\end{bmatrix}=\begin{bmatrix}u_1^e\\ u_2^e\end{bmatrix}$

Q19.	**Which of the following best describes a beam element in Finite Element Analysis**
Option A:	Members supported at one end and is subjected to transverse loading
Option B:	Members supported at one or both the ends or in between and are subjected to axial loading
Option C:	Members supported at one or both the ends or in between and is subjected to transverse loading
Option D:	Members supported at one or both the ends and are subjected to no loading
Q20.	**In one of the property of shape function, summation of shape function is**
Option A:	n
Option B:	2n
Option C:	1
Option D:	0
Q21.	**In case of a truss member if there are 3 nodes and each node 2 DOF, then the order of Stiffness matrix is**
Option A:	2x2
Option B:	3x3
Option C:	2x3
Option D:	6x6
Q22.	**Which of the following is true for plane strain conditions**
Option A:	Opted when the thickness is very less as compared to the size of the domain
Option B:	Opted when the thickness is very large as compared to the size of the domain
Option C:	Never opted when the thickness is very less as compared to the size of the domain
Option D:	Never opted when the thickness is very large as compared to the size of the domain
Q23.	**The governing equation for free transverse vibration of a beam is given by**
Option A:	$EI\frac{\partial^4 v}{\partial x^4} + \rho A\frac{\partial^2 v}{\partial t^2} = 0$
Option B:	$EA\frac{\partial^4 v}{\partial x^4} + \rho A\frac{\partial^2 v}{\partial t^2} = 0$
Option C:	$MC\frac{\partial^4 v}{\partial x^4} + \rho A\frac{\partial^2 v}{\partial t^2} = 0$
Option D:	Governing Differential Equation does not exist
Q24.	**Which of the following denotes shape function of a rectangular element with four nodes at the vertices**

Option A:	$\left[1-\frac{2x}{l}\right]\left[1-2\frac{y}{h}\right],\frac{x}{l}\left[1-\frac{2y}{h}\right],\frac{xy}{lh},\frac{y}{h}\left(1-\frac{x}{l}\right)$
Option B:	$\left[1-\frac{x}{l}\right]\left[1-\frac{y}{h}\right],\frac{x}{l}\left[1-\frac{y}{h}\right],\frac{xy}{lh},\frac{y}{h}\left(1-\frac{x}{l}\right)$
Option C:	$\left[1-\frac{2x}{h}\right]\left[1-2\frac{y}{h}\right],\frac{x}{h}\left[1-\frac{2y}{h}\right],\frac{xy}{lh},\frac{y}{h}\left(1-\frac{x}{l}\right)$
Option D:	Shape function of a rectangular element does not exist
Q25.	**The rows of pascals triangle for the generation of the _________ family of the triangular elements.**
Option A:	Lagrange
Option B:	Hermite
Option C:	polynomial
Option D:	cubic polynomial