Program: BE Mechanical Engineering

Curriculum Scheme: Revised 2012

Examination: Third Year Semester VI

Course Code: MEC606 and Course Name: Finite Element Analysis

Time: 1hour | Max. Marks: 50

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

Q1.	Dirichlet boundary conditions are defined as
Option A:	Essential boundary conditions on secondary variables
Option B:	Essential boundary conditions on tertiary variables
Option C:	Essential boundary conditions on primary variables
Option D:	Essential boundary conditions on constants
Q2.	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
Q3.	The derivatives of 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
Q4.	The process of numbering the nodes throughout the analysis is called
Option A:	Nomenclature
Option B:	Node Numbering
Option C:	Topology
Option D:	Discretization
Q5.	The order of the global stiffness matrix is given by, when 'n' denotes no of nodes, DOF denotes Degree of freedom at each node
Option A:	n * DOF
Option B:	n/ DOF
Option C:	DOF / n
Option D:	n^2 * DOF
Q6.	Which among the given differential equations, Rayleigh-Ritz Method can not be applied

Option A:	$3\frac{d^2y}{dx^2} - \frac{dy}{dx} + 8 = 0$
Option B:	$\frac{d^2y}{dx^2} + 3x\frac{dy}{dx} - 6y = 0$
Option C:	$-\frac{d}{dx}\left[(x-1)\frac{du}{dx}\right] = x^2$
Option D:	$\frac{dy}{dx} - x = 0$
Q7.	The point in the entire structure is defined using coordinates system is Known as
Option A:	local coordinate
Option B:	natural coordinate
Option C:	region coordinate
Option D:	global coordinate
Q8.	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
Q9.	The shape function of a linear element with two nodes is given by
Option A:	$\left[1-\frac{x}{h_e}\right], \frac{x}{h_e}$
Option B:	$\left[1-\frac{2x}{h_e}\right], \frac{x}{h_e}$
Option C:	$\left[1-\frac{2x}{h_e}\right], \left[1-\frac{x}{h_e}\right]$
Option D:	$\left[1-\frac{2x}{h_e}\right], \left[1-\frac{4x}{h_e}\right]$
Q10.	Which of the following is true for secondary variables in a Global Matrix Equation
Option A:	Load =0 if no external force acting at that node
Option B:	Load =0 if external force acting at that node
Option C:	Load =Non Zero if no external force acting at that node
Option D:	Load =Non Zero if external force acting at that node
Q11.	Which of the following is true for primary variables in a Global Matrix Equation
Option A:	value of the primary variable at node 2 of the first element is the same as the value of the primary variable of node 1 of the second element
Option B:	value of the secondary variable at node 2 of the first element is the same as the value of the primary variable of node 1 of the second element
Option C:	value of the primary variable at node 1 of the first element is the same as the value of the primary variable of the node 2 of the second element

Option D:	value of the primary variable at node 2 of the third element is the same as the value of the primary variable of node 1 of the second element
Q12.	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
Q13.	For thermal analysis, the field variable is __________.
Option A:	stress
Option B:	strain
Option C:	displacement
Option D:	temperature
Q14.	CST element is an acronym for
Option A:	Continuous Stress Topology
Option B:	Constant Stress Triangle
Option C:	Constant Strain Triangle
Option D:	Continuous Strain Triangle
Q15.	If the number of nodes used for defining the geometry is same as the number of nodes used defining the displacements, then it is known as
Option A:	Sub Parametric elements
Option B:	Iso Parametric elements
Option C:	Super Parametric elements
Option D:	Meta Parametric Elements
Q16.	If the number of nodes used for defining the geometry is less than the number of nodes used for defining the displacements, then it is known as
Option A:	Sub Parametric elements
Option B:	Iso Parametric elements
Option C:	Super Parametric elements
Option D:	Meta Parametric Elements
Q17.	A constant term in the displacement function ensures __________.
Option A:	Constant mode
Option B:	zero stress
Option C:	rigid body mode
Option D:	zero deformation
Q18.	Many three-dimensional problems in engineering exhibit symmetry about an axis of rotation. Such type of problem is solved by a special two-dimensional element called
Option A:	Circular Element

Option B:	Symmetrical Element
Option C:	Axisymmetric Element
Option D:	Chiral Elements
Q19.	Which of these are not a source of error in FEA
Option A:	Discretization Errors
Option B:	Formulation Errors
Option C:	Numerical Errors
Option D:	Human Errors
Q20.	Use of elements that do not describe the behaviour of the physical problem is a type of which error
Option A:	Discretization Errors
Option B:	Formulation Errors
Option C:	Numerical Errors
Option D:	Human Errors
Q21.	Sometimes material characteristics of solids such as rubber; viscous bars etc. cannot have isolated fundamental properties. Such elements are represented through a series and parallel combinations of fundamental elements and are termed as ________.
Option A:	compound element
Option B:	functional element
Option C:	active element
Option D:	none
Q22.	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
Q23.	The equation for exact solution for natural frequency of a bar is
Option A:	$\omega_i = \frac{i\pi}{2L}\sqrt{\left(\frac{E}{\rho A}\right)}$
Option B:	$\omega_i = \frac{i\pi}{2L}\sqrt{\left(\frac{E}{\rho}\right)}$
Option C:	$\omega_i = \frac{i\pi}{2L}\sqrt{\left(\frac{E}{\rho AB}\right)}$
Option D:	Exact solution for natural frequency does not exist
Q24.	The problems that involve the determination of different values of parameter λ that satisfies the equation $A(u) = \lambda B(u)$ where A and B are linear differential

	operators are called as
Option A:	Eithervalue problem
Option B:	Eigenvalue problem
Option C:	Eagervalue problem
Option D:	Eighartvalue problem
Q25.	A 3 noded simply supported beam gives _______________ number of frequencies.
Option A:	3
Option B:	7
Option C:	4
Option D:	5