These are sample MCQs to indicate pattern, may or may not appear in examination

University of Mumbai
Online Examination 2020

Program: BE in Automobile Engineering

Curriculum Scheme: Revised 2016

Examination: Third Year Semester VI

Course Code: AEC603 and Course Name: Finite Element Analysis

Time: 1 hour Max. Marks: 50

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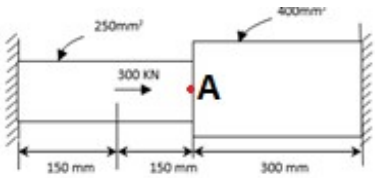
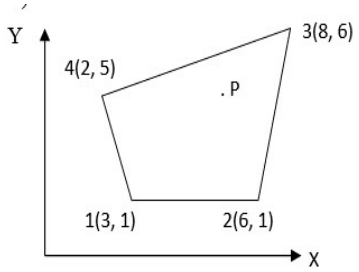
Note to the students: - All the Questions are compulsory and carry equal marks.

Q1.	Finite Element Method gives
Option A:	approximate and exact solutions
Option B:	approximate numerical solutions
Option C:	exact solutions
Option D:	real solution
Q2.	In which method, weighting function is considered as unity
Option A:	least square
Option B:	galerkin
Option C:	petro galerkin
Option D:	sub domain
Q3.	In approximate solution Degree of polynomial should be
Option A:	Equal to order of D.E.
Option B:	One more than order of D.E.
Option C:	One less than order of D.E.
Option D:	zero
Q4.	For approximate solution of equation dy/dx = x , the expression for residue R is
Option A:	dy/dx + x
Option B:	dy/dx - x
Option C:	dy/dx * x
Option D:	dy/dx / x
Q5.	In weak form, what is weakened
Option A:	degree
Option B:	order
Option C:	degree & order
Option D:	range
Q6.	Increasing the no. of nodes of an element

Option A:	decrease the order of element
Option B:	increase the order of element
Option C:	keeps the order same
Option D:	has no relation with the order of element
Q7.	Process of numbering the node is called as
Option A:	Topology
Option B:	Analogy
Option C:	Tribology
Option D:	Geology
Q8.	Number of displacement polynomials used for an element depends on
Option A:	Nature of Element
Option B:	Type of Element
Option C:	Degree of freedom
Option D:	Nodes
Q9.	Each node of a 1-D beam element has how many degrees of freedom?
Option A:	1
Option B:	2
Option C:	3
Option D:	4
Q10.	1D element with 4 nodes is a
Option A:	constant element
Option B:	linear element
Option C:	quadratic element
Option D:	cubic element
Q11.	The matrix equation for structural analysis is
Option A:	[K][F]={U}
Option B:	{U}[K]=[F]
Option C:	[K]{U}=[F]
Option D:	[F]{U}=[K]
Q12.	The size of the global stiffness matrix for a truss assembly with 2 links will be
Option A:	2x2
Option B:	3x3
Option C:	4x4
Option D:	6x6

Q13.	For the step bar as shown, if the deformation at the point A is 0.01mm, the magnitude of stress in element with larger cross section area with E = 200GPa will be 
Option A:	1.34MPa
Option B:	13.4MPa
Option C:	6.67MPa
Option D:	0.67MPa
Q14.	In a triangular element the DOF at each node is
Option A:	0
Option B:	1
Option C:	2
Option D:	3
Q15.	The no. of nodes in a LST element is
Option A:	2
Option B:	3
Option C:	4
Option D:	6
Q16.	Truncation error comes due to
Option A:	numerical errors
Option B:	discretization error
Option C:	formulation errors
Option D:	convergence error
Q17.	Which of the following is not a convergence criteria
Option A:	polynomial should be complete polynomial
Option B:	polynomial should be continuous over the element and also differentiable
Option C:	approximate solution should be interpolation function of primary variable at nodes
Option D:	h-method should be used compulsorily

Q18.	For the given quadrilateral element, both the local coordinates at the point P is 0.57735. The Cartesian coordinates at point P will be 
Option A:	(7.5, 5)
Option B:	(6.54, 5.5)
Option C:	(6.44, 4.78)
Option D:	(7.9, 4)
Q19.	The stiffness matrix dimension for a three node triangular element is
Option A:	2x2
Option B:	3x3
Option C:	6x6
Option D:	9x9
Q20.	The Stress-Strain Relation (D) Matrix for Plane Strain Condition is
Option A:	$\frac{E}{1-\nu^2}\begin{bmatrix} 1 & \nu & 0 \\ \nu & 1 & 0 \\ 0 & 0 & \frac{1-\nu}{2} \end{bmatrix}$
Option B:	$\frac{E}{1-\nu^2}\begin{bmatrix} 1 & \nu & 0 \\ \nu & 1 & 0 \\ 0 & 0 & \frac{1-2\nu}{2} \end{bmatrix}$
Option C:	$\frac{E}{(1+\nu)(1-2\nu)}\begin{bmatrix} 1-\nu & \nu & 0 \\ \nu & 1-\nu & 0 \\ 0 & 0 & \frac{1-2\nu}{2} \end{bmatrix}$
Option D:	$\frac{E}{(1+\nu)(1-2\nu)}\begin{bmatrix} 1-\nu & \nu & 0 \\ \nu & 1-\nu & 0 \\ 0 & 0 & \frac{1-\nu}{2} \end{bmatrix}$
Q21.	The Jacobian matrix is a
Option A:	single column matrix
Option B:	diagonal matrix
Option C:	matrix of any dimension
Option D:	square matrix
Q22.	In 2D stress analysis, the shear strain in

Option A:	$\frac{\delta u}{\delta y}$
Option B:	$\frac{\delta v}{\delta x}$
Option C:	$\frac{\delta u}{\delta y}+\frac{\delta v}{\delta x}$
Option D:	$\frac{\delta u}{\delta x}+\frac{\delta v}{\delta y}$
Q23.	Which analysis deals with determination of natural frequency?
Option A:	Static analysis
Option B:	Structural analysis
Option C:	Thermal analysis
Option D:	Modal analysis
Q24.	The Governing equation for free transverse vibration of beam is given by
Option A:	$\frac{1}{EI}\frac{\partial^4 v}{\partial x^4}+\frac{1}{\rho A}\frac{\partial^2 v}{\partial t^2}=0$
Option B:	$EI\frac{\partial^4 v}{\partial x^4}+\rho A\frac{\partial^2 v}{\partial t^2}=0$
Option C:	$EI\frac{\partial^4 v}{\partial x^4}+\frac{1}{\rho A}\frac{\partial^2 v}{\partial t^2}=0$
Option D:	$\frac{1}{EI}\frac{\partial^4 v}{\partial x^4}+\rho A\frac{\partial^2 v}{\partial t^2}=0$
Q25.	Natural Frequency of axial vibration of bar (E = 200GPa, ρ = 7800 kg/m^3, L=1 m) fixed at one end using lumped mass matrices using one linear element is given by
Option A:	7161.51 rad
Option B:	8159.94 rad
Option C:	7751.26 rad
Option D:	8770.58 rad