

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

**University of Mumbai
Online Examination 2020**

Program: TE 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

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

Q1.	The primary variable in the problem of pipe flow is -----
Option A:	Viscosity
Option B:	Hydrostatic Pressure
Option C:	Flow Source
Option D:	Flow rate
Q2.	To tally the computed shape functions of a 3 noded triangular element which of the following conditions should satisfy?
Option A:	Summation of all shape functions should be equal to zero
Option B:	Summation of all shape functions should be equal to one
Option C:	Summation of all shape functions should be equal to three
Option D:	Summation of all shape functions should be equal to (1/3)
Q3.	In a particular axial Deformation of Bar problem, if one end is subjected by an axial load and it is specified, then the type of boundary condition is ----- -----
Option A:	Essential type
Option B:	Natural type
Option C:	Mixed type
Option D:	Cauchy's type
Q4.	If four springs are attached in series, extreme end points of this spring cart system are fixed. Assume node numbers are given from left to right serially, at which nodes displacements will be observed?
Option A:	1,2,3
Option B:	3,4,5
Option C:	2,3,4,5
Option D:	2,3,4
Q5.	For a differential equations in which the right-hand side value is specified with zero value, then it is called as -----differential equations.
Option A:	Non Homogeneous

Option B:	Homogeneous
Option C:	Heterogeneous
Option D:	Zero
Q6.	When a thin plate is subjected to loading in its own plane only the condition is called?
Option A:	Plane stress
Option B:	Plane strain
Option C:	Zero stress
Option D:	Zero strain
Q7.	In 2D finite element analysis, when thickness is very small as compared to the size of the domain, which of the following condition should be considered?
Option A:	Serendipity conditions
Option B:	Plane strain conditions
Option C:	Axis-symmetric conditions
Option D:	Plane stress conditions
Q8.	During assembly of element equations, the connectivity conditions pertaining to secondary variables at junction node are assumed to be -----
Option A:	Balanced
Option B:	Continuous
Option C:	Un balanced
Option D:	Discontinuous
Q9.	Identify the sequence of steps in Finite Element Method: 1. Solving for primary variables 2. Imposition of boundary conditions 3. Post processing 4. Finite Element Discretization 5. Assemblage. 6. Deriving element equations.
Option A:	1-2-3-4-5-6
Option B:	2-1-4-3-6-5
Option C:	4-1-5-2-6-3
Option D:	4-6-5-2-1-3
Q10.	With lumped mass matrix , the differential equation of vibration refers to
Option A:	Elastic Coupling
Option B:	Inertial Coupling
Option C:	Mode Superposition
Option D:	Both Inertial and Elastic Coupling
Q11.	In stress strain relationship matrix [D], v stands for-----

Option A:	Volume
Option B:	Displacement
Option C:	Poisson's ratio
Option D:	Modulus of Elasticity
Q12.	If deformation at node 1 and 2 of bar element is 0mm and 0.01193mm respectively, $E=200\text{KN/mm}^2$ and length of element is 200mm then stress in the element is -----
Option A:	11.93N/mm ²
Option B:	11.00N/mm ²
Option C:	10.93N/mm ²
Option D:	10N/mm ²
Q13.	For two dimensional plane stress problems normal and shear stress are----- -----
Option A:	Zero
Option B:	Equal
Option C:	Not Equal
Option D:	Infinity
Q14.	For a particular FE mesh, the node numbers are assigned arbitrarily from left to right for 1-D problem as (1, 4, 5, 3, 2), then the value of Half Band Width of the assembled global stiffness matrix is -----
Option A:	2
Option B:	3
Option C:	4
Option D:	5
Q15.	As per Euler Bernoulli Beam Theory, it is assumed that plane cross section -- ----- to the axis of the beam remain plane and ----- to the axis after deformation
Option A:	Perpendicular, Parallel
Option B:	Perpendicular, Perpendicular
Option C:	Parallel, Perpendicular
Option D:	Parallel, Parallel
Q16.	Use of bigger size elements while compare to smaller size of elements for attaining FEM solution, then computational time takes is ----- -----
Option A:	More
Option B:	Exact
Option C:	Infinite
Option D:	Less
Q17.	During FE formulation, the degree of approximation used to describe the

	coordinate transformation is greater than the degree of approximation used to represent a dependent variable , then that formulation is termed as -----
Option A:	Sub-parametric
Option B:	Iso-parametric
Option C:	Super parametric
Option D:	Poly parametric
Q18.	The secondary variable in the problem of axial deformation of bar is ----- -----
Option A:	Young's Modulus
Option B:	Longitudinal Displacement
Option C:	Distributed axial force
Option D:	Axial load
Q19.	What is the relation between torque (T), with angular twist (θ),when Torque is subjected on a constant Circular cross section circular member with polar moment of Area (J), length (L), shear modulus (G) is ----- ---
Option A:	$(GL/J) \theta$
Option B:	$(GJL) \theta$
Option C:	$(GJ/L) \theta$
Option D:	$(JL/G) \theta$
Q20.	The number of nodes in 1-D cubic order element are -----
Option A:	2
Option B:	4
Option C:	3
Option D:	5
Q21.	In analysis using CST element, for better results aspect ratio should be –
Option A:	Medium
Option B:	As large as possible
Option C:	Small
Option D:	As small as possible
Q22.	The weak form method is -----
Option A:	Galerkin
Option B:	Least Square
Option C:	Rayleigh-Ritz
Option D:	Collocation
Q23.	The number of terms are required to describe interpolating polynomial for 2D Triangular Quadratic Element as -----
Option A:	6
Option B:	10

Option C:	4
Option D:	3
Q24.	Normalizing eigenvector w.r.t. mass matrix is useful in
Option A:	Mode superposition
Option B:	Evaluating natural frequencies
Option C:	Frequency response
Option D:	Damped vibrations
Q25.	Which Variational Method we use to determine the unknown coefficient parameters by requiring the residual to vanish identically at N- selected points in the given Domain.
Option A:	Galerkin
Option B:	Least Square
Option C:	Rayleigh-Ritz
Option D:	Collocation