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 2012

Examination: Third Year Semester VI

Course Code: AEC606 and Course Name: Finite Element Analysis

Time: 1 hour Max. Marks: 50

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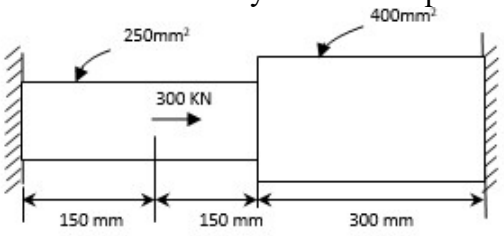
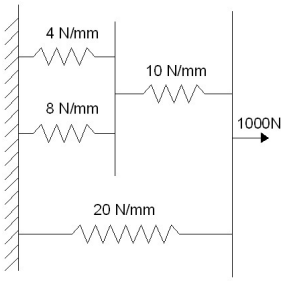
Note to the students: - All the Questions are compulsory and carry equal marks.

Q1.	Finite element analysis is not used for
Option A:	Complex problem solution
Option B:	Non-homogeneous material solution
Option C:	Anisotropic material solution
Option D:	Exact solution
Q2.	In the given differential equation , y(1) = 2, is not a $3\frac{d^2y}{dx^2}-\frac{dy}{dx}+8=0; 0<x<1; y(0)=1 \; and \; y(1)=2$
Option A:	Essential boundary condition
Option B:	Dirichlet boundary condition
Option C:	Homogeneous boundary condition
Option D:	Boundary condition
Q3.	The order and degree of the differential equation is $3\frac{d^2y}{dx^2}-\frac{dy}{dx}+8=0; 0<x<1; y(0)=1 \; and \; y(1)=2$
Option A:	1,1
Option B:	2,1
Option C:	1,2
Option D:	2,2
Q4.	The degree of the approximate polynomial should be
Option A:	1
Option B:	2
Option C:	One more that the order of the equation
Option D:	One less than the order of the equation
Q5.	Rayleigh Ritz Method is
Option A:	a exact Method
Option B:	a Weak form method

Option C:	a Non-weak form method
Option D:	not a weighted residue method
Q6.	In the given differential equation , dy/dx is a $$3\frac{d^2y}{dx^2}-\frac{dy}{dx}+8=0; 0<x<1; y(0)=1 \; and \; y(1)=2$$
Option A:	Independent variable
Option B:	Primary variable
Option C:	Secondary variable
Option D:	Constant variable
Q7.	For given differential equation, one of the weight function for Galerkin Method is $$3\frac{d^2y}{dx^2}-\frac{dy}{dx}+8=0; 0<x<1; y(0)=1 \; and \; y(1)=2$$
Option A:	x^3
Option B:	x^3+1
Option C:	x^3+x
Option D:	x^3-x
Q8.	In a fluid analysis, the primary variable is
Option A:	Pressure
Option B:	Flow rate
Option C:	Reynolds number
Option D:	Density of fluid
Q9.	The minimum no. of nodes for 1D analysis of the step bar shown below is 
Option A:	1
Option B:	2
Option C:	3
Option D:	4
Q10.	The size of the global stiffness matrix for the system shown below with minimum number of elements will be

	
Option A:	2x2
Option B:	3x3
Option C:	4x4
Option D:	6x6
Q11.	The shape functions in order at node 1 of a 1D quadratic element will be
Option A:	1,0,0
Option B:	0,1,0
Option C:	1,0,0,0
Option D:	0,1,0,0
Q12.	The size of the element stiffness matrix of a truss element is
Option A:	2x2
Option B:	3x3
Option C:	4x4
Option D:	5x5
Q13.	In a CST, _____ is not constant
Option A:	Deformation
Option B:	Stress
Option C:	Strain
Option D:	Elasticity
Q14.	For a super parmetric element,
Option A:	the shape function to define the geometry are suppressed
Option B:	the no. of shape functions to define the geometry is equal than that used to define the primary variable.
Option C:	the no. of shape functions to define the geometry is less than that used to define the primary variable.
Option D:	the no. of shape functions to define the geometry is more than that used to define the primary variable.
Q15.	For a CST element, if N1 = 0.3 , N2=0.4 and N3 = 0.3 at a point P within the element and the displacement in x direction is 0.2mm, 0.5m and 0.8mm at node 1, 2 and 3 respectively, then the value of the displacement in x direction at point P will be
Option A:	0.43 mm
Option B:	0.47 mm
Option C:	0.5 mm
Option D:	0.53 mm

Q16.	The art of subdividing the structure into a convenient number of smaller elements is known as
Option A:	assemblage
Option B:	continuum
Option C:	traction
Option D:	discretization
Q17.	Arrange the general steps off finite element method (a)discretizing (b)displacement (c)stiffness matrix (d)element stress strain
Option A:	a,b,c,d
Option B:	a,c,b,d
Option C:	c,d,b,a
Option D:	c,b,d,a
Q18.	In which year the finite element term was introduced by Dr.Ray Clough
Option A:	1955
Option B:	1958
Option C:	1960
Option D:	1968
Q19.	Convergence is a process of _____
Option A:	Dividing the domain
Option B:	Converting local coordinates into natural coordinates
Option C:	Arriving at a solution that is close to the exact solution
Option D:	Arriving at a solution that is far from the exact solution
Q20.	Jacobian matrix for CST element is
Option A:	$\begin{bmatrix} -\gamma_3 & \beta_3 \\ \gamma_2 & -\beta_2 \end{bmatrix}$
Option B:	$\begin{bmatrix} \gamma_3 & \beta_3 \\ \gamma_2 & \beta_2 \end{bmatrix}$
Option C:	$\begin{bmatrix} \gamma_2 & -\beta_2 \\ -\gamma_3 & \beta_3 \end{bmatrix}$
Option D:	$\begin{bmatrix} \gamma_3 & -\beta_3 \\ -\gamma_2 & \beta_2 \end{bmatrix}$
Q21.	In the governing equation for heat transfer problem [K]{T}=[Q], Q stands for
Option A:	Nodal Force
Option B:	Nodal Temperature
Option C:	Nodal Heat flow
Option D:	Nodal stress
Q22.	The stress-strain relation for plane stress and plane strain condition is
Option A:	Same
Option B:	Different

Option C:	Modulus of Elasticity, E
Option D:	Does not exists
Q23.	Which is a type of mass matrix used for modal analysis in FEA
Option A:	Consistent mass matrix
Option B:	Axis Mass Matrix
Option C:	Jacobian Matrix
Option D:	Stiffness matrix
Q24.	Lumped Mass Matrices for axial vibration of bar is given by
Option A:	$\frac{\rho Al}{6}\begin{bmatrix}1 & 2\\ 2 & 1\end{bmatrix}$
Option B:	$\frac{\rho Al}{6}\begin{bmatrix}2 & 1\\ 1 & 2\end{bmatrix}$
Option C:	$\frac{\rho Al}{6}\begin{bmatrix}1 & 0\\ 0 & 1\end{bmatrix}$
Option D:	$\frac{\rho Al}{6}\begin{bmatrix}0 & 1\\ 1 & 0\end{bmatrix}$
Q25.	Which analysis deals with determination of natural frequency?
Option A:	Static analysis
Option B:	Thermal analysis
Option C:	Modal analysis
Option D:	structural analysis