16ME401 - Finite Element Analysis

WorkSheet - Quiz

S.No	Question	Answer
Unit 1 Introduction		
1	In which of the methods of engineering analysis prototype are used	Experimental
2	The finite difference method is used for solving_____ kind of problems	Heat Transfer & structural
3	The art of subdividing the structure into a convenient number of smaller elements is known as	Discretization
4	Basic Idea of FEA were developed by	Aircraft Engineers
5	At first Modern Development of FEA done in the field of	structural
6	Mention the two general methods of FEA	Force and Displacement
7	Triangular and rectangular elements are considered as	2D elements
8	Which type of interpolation function are mostly used	polynomial
9	Mention the four classification of weighted residual methods	point collacation, sub domain, least square and galerkin

S.No	Question	Answer
10	Plate bending problem and axisymmetric problem can be easily solved using _____ Method	variation method
11	one dimensional elements can be easily solved using _____ Method	direct equlibrium
12	Artificial discretization can called as _____	continuum
13	the process of uniting the various elements together is called	Assemblage
14	The elements are connected at various joints called	node
15	The ratio of largest dimension of the element to the smallest dimension is called	Aspect ratio
16	If the subsidary condition are given at more than one value of the independent variable, the problem is	Boundary value problem
17	List the factors considered for selection of elements	Accuracy, size,DOF
18	List the three methods to solve the eigen value problem	Determinant, transformation, vector iteration method
19	In which method the trail function itself is considered as the weighting function	galerkin's Method

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20	In which method weighting are chosen as the unity over a portion and zero else where	sub-domain collaction
21	Variational Method is referred as _____ form	weak
22	Whether weighted residual statement can be suitable for boundary conditions	no
23	Rayleigh ritz method is also known as	Integral approach or Variational Method
24	Variational method makes use of the principle called	Principle of minimum potential energy
25	Write the equation of principle of minimum potential energy	$\prod$ = U-H
26	Mention the three phases of FEM	Pre-processing, Analysis and post-processing
27	Whether NISA or COSMOS are FEA analysis software	BOTH
28	Which coordinate system are defined for the entire system	global
29	Eigen value problem can be also known as	Boundary value problem

S.No	Question	Answer
30	In which method integral of the weighted square of the residual is chosen as weighting function	Least square
Unit 2 One Dimensional Problems		
S.No	Question	Answer
31	Bar and Beam elements are considered as	1D elements
32	A bar is a member which resist only	Axail
33	Mention the three types of loading acts on the body	Body force, traction force and point load
34	Frictional resistance and viscous drag are known as _____ force	Traction
35	Mention the three types of coordinates	Local. Global and natural
36	If the coordinate system is formed for the one particular element , then the coordinate system is said to be _____	local
37	The value of shape function for the non nodal points is	zero

S.No	Question	Answer
38	sum of the shape function is equal to	one
39	When there is a reduction in amplitude over every cycle of vibration, motion is said to be	Damped vibration
40	Undamped vibration is also known as _____ vibration	Deterministic
41	if the coordinate system is formed for the one particular element , then the coordinate system is said to be _____	transverse vibration
42	The boundary condition which are in the differential form of field variable is known as	Secondary boundary condition
43	The transmission of energy from one region to another region due to temperature difference is	Heat transfer
44	The ratio of maximum displacement of forced vibration to the static deflection under static force is known as	magnification factor
45	Number of cycles per second is referred as	Frequency
46	The ratio of actual damping coefficient to the critical damping coefficient is	Damping ratio
47	When the inertia effect due to the mass of the component and externally applied load is considered, then the analysis is called	Dynamic analysis

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48	List the two methods used for solving transient vibration problem	mode super position, Direct integration method
49	A structure made of several bars, riveted or welded together is referred as	truss
50	stiffness matrix is a _____ matrix	symmetric
51	The distributed force acting on the surface of the body is called	traction force
52	Equations of motion can also be solved by using_____	lagrangian approach
53	what are the two types of mass matrix	lumped and consistent mass matrix
54	EI can be referred as _____	Flexural rigidity
55	Transverse vibration is also known as	Flexural vibration
56	CJ can be referred as _____	Torsional rigidity
57	Which theory holds the transverse vibration of the beam	Deflection theory of beam

S.No	Question	Answer
58	Vibration in machine tools, electric bells, vibratory conveyors are referred as	forced vibration
59	What are the three modes of heat transfer	conduction, convection and radiation
60	which mode of heat transfer is a electromagnetic wave form	Radiation
	Unit 3 Two Dimensional Scalar Variable Problems	
1	How many nodes are in 2D elements?	3 or more
2	The basic element in 2D Element is _____	Triangular
3	A quadrilateral element is formed by _____	assembling 2 or more triangular elements
4	Hydraulic cylinder rod analysis comes under _____ Analysis	2D
5	Two Dimensional element is extremely important for which type of analysis?	plane stress and plane strain
6	Which is defined as a state of strain in which the strain normal to the XY plane and the shear strain is assumed to be zero.	Plane strain Analysis

S.No	Question	Answer
7	Pressure acting on the surface edge or face of a member is known as _____	Surface traction
8	Plates with holes and plates with fillets are comes under _____ Analysis	plane stress
9	Three kinds of finite element used in 2D problems are _____	Triangular, Rectangular, Quadrilateral
10	Within each element body force, traction force, cross section are said to be constant. Say true or false	TRUE
11	In 1D Problem, each node is allowed to move only in _____ Direction	X positive and X negative
12	Better results Are obtained by _____- the number of nodes	Increasing
13	Three noded triangular element is also known as _____ element	CST Element
14	The element is called CST because it has constant _____ Throughout it	Strain
15	How many degrees of freedom are there in CST Element?	Six
16	"When a material is loaded within elastic limit, the stress is dirctly propotional to the strain" is given by	Hookes law

S.No	Question	Answer
17	Youngs modulus is also known as _____	Modulus of elasticity
18	Shear Modulus is also known as _____	Modulus of rigidity
19	For 2D Plane stress problems, the normal stress and shear stresses are _____	Zero
20	In 2D Problem [D] is a _____	Constitutive matrix
21	A Six noded triangular element is known as _____	LST Element
22	How many degrees of freedom are there in LST Element?	12
23	The diaplacement function of CST element is _____	Linear
24	The diaplacement function of LST element is _____	Quadratic
25	constitutive matrix is also called as _____ matrix	Stress strain relationship
26	A pair of equal magnitude but opposite in directions acting on a body is termed as _____	torsion

S.No	Question	Answer
27	In theory of torsion, the material should be _____	Homogeneous
28	The locus of points through which a fluid particle of fixed identity passes as it moves in space is known as _____	Path Line
29	Ten Noded Triangular element is known as _____	QST Element
30	QST element is also known as _____	Cubic displacement Triangle
	Unit-- Two Dimensional	
1	Elasticity Equations are used for solving _____ Problem	Structural Mechanics
2	How amny number of basic sets of Elasticity equations are there?	Four
3	The ratio of change in length by original length is termed as _____	Strain
4	The compatibility equations are mostly used in _____	Continuum mechanics and the theory of elasticity
5	Three dimensional problem in Engineering which exhibit symmetry about an axis of rotation is said to be	Axisymmetric Problem

S.No	Question	Answer
6	The Coordinates names of Axisymmetric Element are _____	r, , z
7	In Axisymmetric Problem, _____ and _____ should be symmetric about the axis of rotation	Boundary condition and loading condition
8	A figure whose vertical cross section is a plane triangle is a _____	Triangular torus
9	In the case of Axisymmetric problem, the dispalcement and distributed body force value are identified by _____ plane	r-z palne
10	Planar structure with a very small thickness in comparison to the planar dimensions is a _____	plate
11	The force applied on a plate should be _____ to the plane of the plate	perpendicular
12	Thin Plate Theory is intiated for _____ element	Beam
13	Thin plate theory was Found by _____	Bernoulli
14	Love and Kirchoff applied the Classical thin plate theory to _____ elements	Plate and Shell
15	in Classical Plate theory, the transverse shearing strain are assumed to be _____	Zero

S.No	Question	Answer
16	If the maximum Deflection is one tenth of hickness, then the plate is said to be _____	Thin Plate
17	Which theory is used for thick plate where the effect of shear deformation is included?	Mindlin theory
18	If the ratio of thickness to width of the plate is more than 10, then the plate is said to be _____	thick plate
19	Which theory is used for thin plate analysis?	Kirchoffs thoery
20	_____ element is the element in which only continuity of nodal variables are to be ensured	C0 Continuity
21	_____ element is the first order element in which highest order of derivative of w is one only	C1 Continuity
22	_____ element is the first order element in which Second derivative of ware also nodal unknowns	C2 Continuity
23	A rectangular plate bending element has _____ degrees of freedom	three
24	Which type of plates finds more application in Civil Engineering Field?	Skew Plates
25	Large span roof, cooling towers, piping system are the examples of _____ elements	Shell

S.No	Question	Answer
26	If the thickness of the shell to the radius of curvature is less than0.05, then the shell can be assumed as a _____	thin shell
27	Which theory is followed for Shell element?	Love - Kirchoffs
28	Name the types of shell element.	flat, curved, solid, degenerated
29	Gear analysis whose thickness is small is a example of _____ Analysis	Plane stress
30	How many nodes are there in Degenerated shell element?	eight
	Unit 5 Isoparametric Elements	
1	The family of elements involving curved boundaries is known as _____ Elements	Isoparametric
2	Isoparametric element is initially brought out by _____	Taig
3	Which coordinate system is used to defdine any point inside the element by a set of dimensionless numbers?	Natural
4	If the number of nodes used for defining the geometry is more than number of nodes used for defining the displacements, then it is known as _____ Element	Super parametric

S.No	Question	Answer
5	If the number of nodes used for defining the geometry is less than number of nodes used for defining the displacements, then it is known as _____ Element	Sub parametric
6	If the number of nodes used for defining the geometry is same as the number of nodes used for defining the displacements, then it is known as _____ Element	Isoparametric
7	Higher order lagrangian elements contains _____ nodes	Internal
8	Shape functions of the 2D elements can be developed by having nodes only on the boundaries for _____ element	Serendipity element
9	Which type of numerical integration method is used to calculate the definite integrals?	Guass quadrature
10	The most direct method in solving dynamic analysis is _____	Explicit dynamics