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Reg No.:_____

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APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
SIXTH SEMESTER B.TECH DEGREE EXAMINATION(R&S), MAY 2019

Course Code: ME308
Course Name: COMPUTER AIDED DESIGN AND ANALYSIS

Max. Marks: 100 Duration: 3 Hours

PART A

Answer any three full questions, each carries 10 marks. Marks

1	a)	Enumerate the applications of computer to the design process?	(5)
	b)	Comment on the advantages of CAD compared to traditional designing?	(3)
	c)	Explain	(2)
		(i) Wireframe modelling	
		(ii) Surface modelling	
2	a)	Explain in details about the 2D transformation of points and line	(5)
	b)	Consider the line of coordinates (1, 1) and (2, 4). Rotate the line about the origin by 30°. Determine the transformation of line.	(3)
	c)	Describe 2D concatenation?	(2)
3	a)	Explain the Data Exchange Formats.	(5)
	b)	Explain Graphic Standards.	(5)
4	a)	A line of end points (5, 8) and (6, 11) should be rotated about one of its end point (5, 8) through 30° anticlockwise. Explain the transformation	(6)
	b)	Explain GUI and ICG	(4)

PART B
Answer any three full questions, each carries 10 marks.

5	a)	Differentiate between Bézier curve and Hermit curve.	(5)
	b)	Comment on the benefits of using B-spline curves.	(3)
	c)	Define Control nets.	(2)
6	a)	Explain the various methods for solid model representation	(8)
	b)	Explain the need of Boolean operation in 2D model?	(2)
7	a)	Write and explain the parametric equation for Bezier curve.	(5)
	b)	Explain various types of surface entities.	(5)

8   a)   Explain about Boundary Representation solid modelling technique.   (5)

     b)   Illustrate the sweep representation modelling citing an example.   (5)

PART C
Answer any four full questions, each carries 10 marks.

9   a)   List and describe steps involved in FEA   (10)

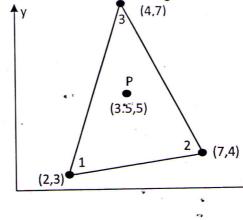10   a)   Derive the interpolation function for constant strain triangular element   (10)

11   a)   A tapered bar of length 600mm is having cross sectional areas of 650 mm^2 (8) and 350mm^2 at two ends. The bar is fixed at the end having larger area and subjected to axial forces 40kN which is acting axially outwards at the smaller end and 10kN, acting at a point 200mm from smaller end and directing axially towards the larger side. The Modulus of Elasticity of the bar is $200*10^3$ N/mm^2. Model the bar with three finite elements and Determine

         i.   The nodal displacements.

         ii.   The stresses in each element.

         iii.   The reaction force at the support.

     b)   What is meant by Dynamic analysis.   (2)

12   a)   Determine the shape functions N_1, N_2 and N_3 at the interior point P for the   (6) triangular element as shown in the figure.

     b)   Derive the stiffness matrix for CST (2D) element   (4)

13   a)   Explain the following terms briefly   (6)

         (i)   Discretization process

         (ii)   Global Stiffness Matrix

         (iii)   Quad4 element

     b)   Differentiate between a Rod element and Bar element.   (4)

14 a) For the plane stress element whose co-ordinates are given by (100, 100),   (8)
(400, 100) and (200, 400). The nodal displacements are u_1=2mm, v_1=1mm,
u_2=1mm, v_2=1.5mm, u_3=2.5mm, v_3=0.5mm.Determine the elemental stress.
Assume E=200 GN/m^2 , μ=0.3, t=10mm

b) Define isoparametric element.   (2)

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