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CODE: 13CE4031 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
IV B.Tech II Semester Supplementary Examinations, February-2021

FINITE ELEMENT METHODS
(Civil Engineering)

Time: 3 Hours **Max Marks: 70**

PART-A

ANSWER ALL QUESTIONS **[1 x 10 = 10 M]**

1. a) State generalized Hook's law?
   b) Differentiate schematically the plane and space truss elements?
   c) Express the integral solution for a shape function of 1-D problems?
   d) Draw neatly the shape function profiles of bar element?
   e) What is Convergency?
   f) Write the expression for the two point Gaussian Quadrature formula for 2D-Analysis?
   g) Write down the stiffness matrix equation for four noded isoparametric quadrilateral elements
   h) Write the shape functions of CST element in Area coordinates?
   i) For a bar element$_{1\text{-}2}$, if q_1= 0.03mm, q_2= -0.005mm, ξ = -0.05. Find shape functions N_1 and N_2
   j) List out the characteristics of Shape function?

PART-B

Answer one question from each unit **[5x12=60M]**

UNIT-I

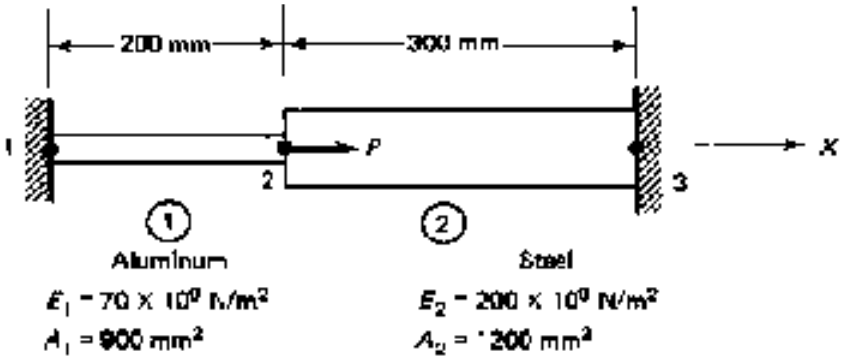
2. a) State and explain the Principle of Minimum Potential Energy?
   b) Derive the general equation for determining the stiffness of an element with usual notations in the form $[K_e] = \oint [B]^T [D][B] dV$.

(OR)

3. Using Raleigh-Ritz method determine the expressions for deflection and bending moments in a simply supported beam subjected to uniformly distributed load over entire span. Find the deflection and moment at mid-span and compare with exact solutions.

UNIT-II

4 Determine the displacements and support reactions for the uniform bar shown in the following figure. P = 300 kN.



(OR)

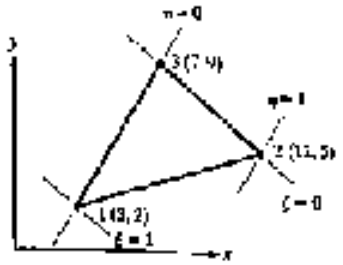
5. a) Schematically differentiate bar element and beam elements?
   b) A simply supported beam of span 2 m is subjected to a point load of 100 kN at the centre and a bending moment of 20 kN-m also at the centre. Analyze the maximum deflection and slope if the flexural rigidity is 800×10^3 N-m^2.

UNIT-III

6. a) List out the characteristics of Shape function?
   b) Derive the consistent load vector in a CST element due to traction on one edge.

(OR)

7. a) Establish the shape functions for four nodded Quadrilateral element?
   b) Determine the Jacobian for the (x, y) – (ξ, η) transformation for the element shown the figure below. Also find the area of the triangle.



UNIT-IV

8. a) State and explain the basic laws on which isoparametric concept is developed.
   b) Establish the shape functions for eight nodded Quadrilateral element?

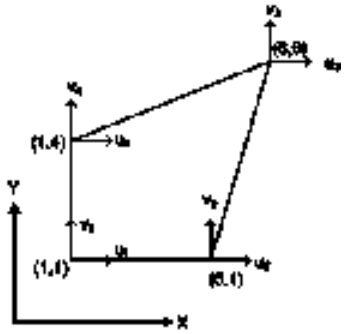
(OR)

9. a) Discuss finite element solution for CST element.

b) The figure shows a four noded quadrilateral. The (x, y) coordinates of each node are given in the figure. The element displacement vector is given as q = [0, 0, 020, 0, 0.15, 0.10, 0, 0.05]^T Find the following:

i) the x, y coordinates of a point P whose location in the master element is given by $\xi = 0.5$ and $\eta = 0.5$ and

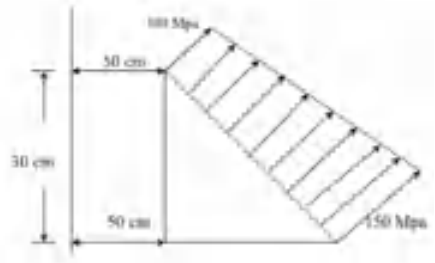
ii) The u, v displacements of the point P.



UNIT-V

10. a) Discuss the applications of axi-symmetric problems?

b) An axisymmetric triangular element is subjected to the loading as shown in figure below, the load is distributed throughout the circumference and normal to the boundary. Derive all the necessary equations and derive the nodal point loads.



(OR)

11. a) Write the expression for one and two point Gaussian Quadrature formula for 1D-Analysis?

b) Analyze the following integral equation using one, two and three point Gaussian Quadrature formula and compare with exact solution.

$$I = \int_{-1}^{+1} \left[3e^{\xi} + \xi^2 + \frac{1}{(\xi+2)}\right] d\xi$$

Given for 1-point formula, $\xi_i 0.0, w_i = 2.0$

2-point formula, $\xi_i = \pm 0.57735, w_i = 1.0$

3-point formula,

$\xi_i = \pm 0.77459, 0.0;\ \ w_i = 0.5555, 0.8888$

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CODE: 13EC4036 SET-1

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
IV B.Tech II Semester Supplementary Examinations, February-2021

CELLULAR AND MOBILE COMMUNICATIONS
(Electronics and Communication Engineering)

Time: 3 Hours **Max Marks: 70**

PART-A

ANSWER ALL QUESTIONS **[1 x 10 = 10 M]**

1. a) What are operating frequency bands of GSM system?
   b) What is Cell Splitting.
   c) Define Doppler spread.
   d) What is Foilage loss?
   e) Give the characteristics of High gain antennas.
   f) Mention different types of handoff.
   g) What is Paging in channels.
   h) What are access channels.
   i) What is the principle involved in CDMA standard.
   j) Outline the TDMA frame structure.

PART-B

Answer one question from each unit **[5x12=60M]**

UNIT-I

2. a) Explain how cellular generations from 1G to 4G have improved data rat and applications. 6M
   b) Explain different types of interference reduction factors. 6M

(OR)

3. a) Discuss the three performance criteria required for attaining Servi Quality in cellular and mobile communication system. 6M
   b) Explain how frequency reuse technique improves the cellular system capacity. 6M

UNIT-II

4. a) Determine the received power in point-to-point transmission between the fixed stations over the water. 6M
   b) Explain different types of non-co-channel interference. 6M

(OR)

5.	a)	Define fading and determine the factors affecting fading in radio propagation.	6M
	b)	Explain how directional antennas with 60 degrees sectoring reduces C/I factor of co-channel interference.	6M

UNIT-III

6.	a)	Explain the need of antenna diversity in wireless communication environment.	6M
	b)	Define Dropped call rate and bring out the mathematical relations for the evaluation of handoff.	6M
		(OR)	
7.	a)	What are the advantages and limitations of using Omni and Non-Omni directional antennas.	6M
	b)	Explain how triangulation method is used for tracking or locating the vehicle.	6M

UNIT-IV

8.	a)	Discuss the concept of frequency management concern to the numbering the channels and grouping into the subset.	8 M
	b)	Write about fixed channel assignment schemes in detail.	4 M
		(OR)	
9.	a)	Explain how channel assignments is done to cell sites	4 M
	b)	Write short notes on Channel Sharing and borrowing.	8 M

UNIT-V

10.	a)	What are the channel types of GSM system? Explain.	6 M
	b)	Illustrate how collision is detected in CSMA scheme.	6M
		(OR)	
11.	a)	Outline the architecture and principle of SDMA scheme.	6M
	b)	Differentiate Pure ALOHA and Slotted ALOHA.	6M

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