

**FINITE ELEMENT METHODS  
(Civil Engineering)****Time: 3 Hours****Max Marks: 70****PART-A****ANSWER ALL QUESTIONS****[1 x 10 = 10 M]**

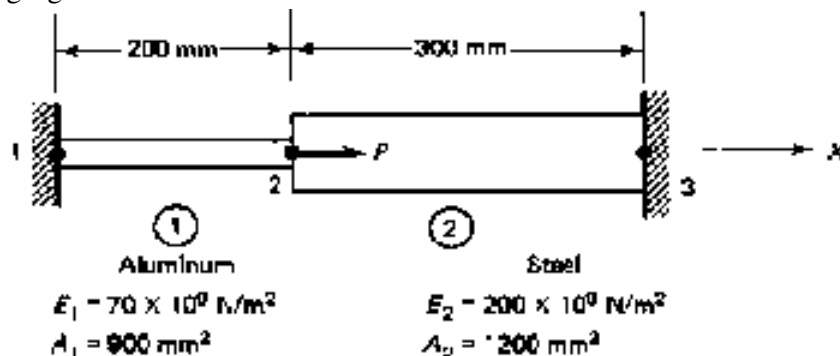
1. a) What is discretization
- b) Define geometric discontinuities.
- c) Write the relation between plane stress and strain.
- d) Define shape function
- e) Explain the concept of FEM
- f) What are nodal forces and nodal points
- g) How do you express the size of global stiffness matrix. .
- h) Define iso-parametric element
- i) What is convergence?
- j) What are static loads.

**PART-B****Answer one question from each unit****[5x12=60M]****UNIT-I**

2. 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. 12M
- (OR)
3. Discuss the following points to be considered while discretizing a structure for finite element analysis: 12M
  - (i) Nodes at discontinuities
  - (ii) Refining mesh
  - (iii) Symmetry usage
  - (iv) Finite representation of infinite bodies

**UNIT-II**

4. Explain the following terms: 12M
  - (i) Nodes, primary nodes, secondary nodes and internal nodes
  - (ii) Local coordinates, global coordinates, natural coordinates and area coordinates
- (OR)
5. Determine the displacements and support reactions for the uniform bar shown in the following figure.  $P = 300 \text{ kN}$ . 12M



### **UNIT-III**

6. Develop a strain-displacement matrix for 4 noded rectangular element. 12M  
(OR)  
7. Derive the stiffness matrixes for a 3 node triangular element. 12M

### **UNIT-IV**

8. Explain eight-node quadrilateral element belonging to serendipity element family. 12M  
(OR)  
9. Differentiate the concepts of Lagrangian and serendipity elements. State their applications. 12M

### **UNIT-V**

10. Explain axi-symmetric analysis using appropriate examples. 12M  
(OR)  
11. Explain the solution technique of numerical integration by one point formula and two point formulas. 12M

# AR13

CODE: 13EE4029

SET-1

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI  
(AUTONOMOUS)

IV B.Tech II Semester Supplementary Examinations, October / November-2020

UTILIZATION OF ELECTRICAL ENERGY  
(Electrical and Electronics Engineering)

Time: 3 Hours

Max Marks: 70

## PART-A

ANSWER ALL QUESTIONS

[1 x 10 = 10 M]

1. a) What is an electric drive?  
b) What is induction heating?  
c) Define luminous intensity  
d) What is speed-time curve of a locomotive?  
e) What is specific energy consumption?  
f) Define coefficient of adhesion.  
g) What are the present specifications of A.C traction in India?  
h) What is polar curve?  
i) What is the equipment used in D.C welding?  
j) What is demand side management?

## PART-B

Answer one question from each unit

[5x12=60M]

### UNIT-I

2. a) Compare individual drive with group drive. 6M  
b) Derive an equation for the temperature rise of a motor from the fundamentals. 6M  
(OR)
3. a) Explain the process of load equalization. 6M  
b) A 15H.P motor has a heating constant of 2hrs.Determine the time in which it attains a temperature of 40°C from 10°C while working continuously on full load, if its final steady temperature is 45°C 6M

### UNIT-II

4. a) What are the advantages of electric heating over other methods of heating? 6M  
b) Compare resistance welding with arc welding 6M  
(OR)
5. a) Explain briefly different types of resistance welding 6M  
b) Compare A.C welding with D.C welding 6M

### UNIT-III

6. a) Explain the working of SV lamp with a neat diagram. 6M  
b) The uniform luminous intensity of a lamp is 300 candela. The illumination directly below the lamp is 100 lux. Find the mounting height of the lamp and the illumination at a distance of 1.5m away from the vertical axis of the lamp 6M

(OR)

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7. a) Explain the working of a MV lamp with a neat diagram. 6M  
b) A drawing hall 30m x 13m with a ceiling height of 5m is to be provided with general illumination of 120 lux. Taking coefficient of utilisation of 0.5 and depreciation factor of 1.4, determine the number of 80W fluorescent lamps required with a luminous efficiency of 40lumen/watt. 6M

## UNIT-IV

8. An electric train has an average speed between start to stop  $V_a = 40$  km/hr acceleration 2.4 km/hr/sec and retardation 4 km/hr/sec. specific tractive resistance 55 N/tones and average motor efficiency is 75%. Estimate the average consumption of energy over a run of 800m, assuming trapezoidal speed time curve ? 12M

(OR)

9. Discuss the merits and demerits of the D.C and 1- $\phi$  a.c systems for the main and suburban line electrification of the railways ? 12M

## UNIT-V

10. A 400 tonnes goods train is to be hauled by a locomotive up a gradient of 20‰ with an acceleration of 1.5 kmph, the coefficient of adhesion is 20‰. Track resistance 40 N/tonne and effective rotating masses are 10‰ of dead weight .find the weight of locomotive? And number of axels? 12M

(OR)

11. Explain the mechanics involved in train moment? 12M

**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) Write one difference between conventional mobile system and cellular systems.
- b) What are the Operations of Cellular Systems
- c) Define Frequency reuse
- d) What is meant by Fading
- e) What are the different types of handoffs
- f) Define Omni directional antennas
- g) Draw the diagram of frequency management chart
- h) Write one difference between Pure ALOHA and Slotted ALOHA.
- i) What is meant by channel barrowing
- j) Write one difference between TDMA and CDMA techniques.

**PART-B****Answer one question from each unit****[5x12=60M]****UNIT-I**

2. a) What are the available two kinds of cell splitting techniques? And what is the need for cell splitting? 6 M
  - b) Describe the various generations of wireless mobile systems 6 M
- (OR)**
3. a) What are the differences between Circuit-Switched Systems Packet-Switched System? Explain in detail. 6 M
  - b) Derive the C/I ratio for cellular systems having reuse factors of 4, 7, and 12 for omni directional antenna 6 M

**UNIT-II**

4. a) Summarize different types of Outdoor propagation models 6 M
  - b) Find the Cochannel Interference Area from a Mobile Receiver. 6 M
- (OR)**
5. a) Describe co-channel interference & Explain co-channel interference reduction factor 6 M
  - b) Find the Cochannel Interference Area Which Affects a Cell Site 6 M

**UNIT-III**

6. a) Explain Omni and Non-Omni directional antennas and list out differences between them 6 M
  - b) Explain the concept of diversity antenna spacing in cell site with simple diagrams 6 M
- (OR)**
7. a) Mention and explain different types of Directional antennas 6 M
  - b) What is meant by handoff initiation? Explain the different methods of handoff Initiation with suitable diagrams 6 M

**UNIT-IV**

8. a) How the channels are Numbered & Grouped explain. 6 M
  - b) What are the different types of channel assignment approaches for mobile units? Explain 6 M
- (OR)**
9. a) Describe the procedure of paging channels used for the land originating calls 6 M
  - b) Explain Channel sharing and borrowing with respect to mobile communication 6 M

**UNIT-V**

10. a) Explain SDMA technique with diagrams 6 M
  - b) Explain a simple GSM network architecture with the help of a neat diagram 6 M
- (OR)**
11. a) Describe the features and services of GSM 6 M
  - b) Explain TDMA technique with diagrams 6 M