

# AR16

CODE: 16MTE1013

SET-2

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI  
(AUTONOMOUS)

I M.Tech II Semester Regular Examinations, July-2017  
FINITE ELEMENT ANALYSIS  
(Thermal Engineering)

Time: 3 Hours

Max Marks:60

Answer any FIVE questions  
All questions carry EQUAL marks

1. (a) Compare FEM with other numerical methods 6
- (b) Discuss Galerkin method 6
2. (a) Use Rayleigh-Ritz method to find the displacement of midpoint of a rod with self weight fixed at both ends and length 2 units. Assume  $\rho g = 1$ ,  $E=A=1$ . 6
- (b) Derive the elasticity matrix for plane stress condition. Write strain displacement relations for 3-D case 6
3. (a) Develop the stiffness matrix and load vector of the stepped bar loaded as shown in the figure 1. Assume  $P = 300$  kN. and  $\Delta T = 60^\circ\text{C}$ . 6

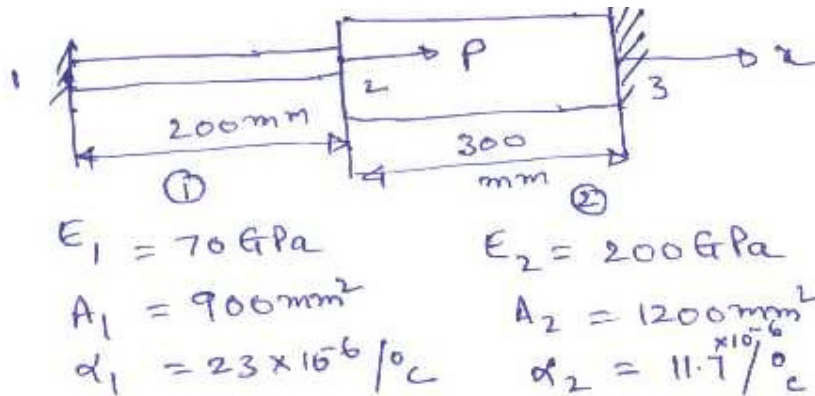
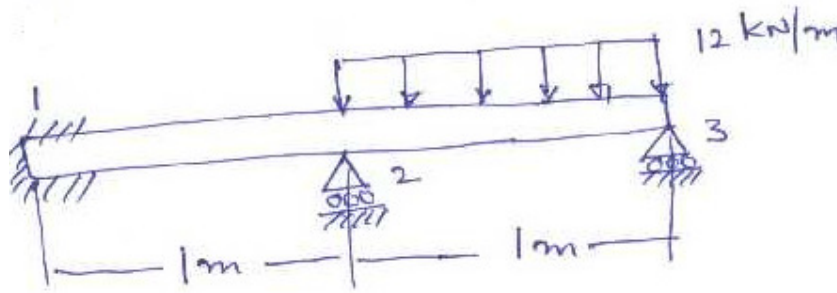


figure 1

- (b) Find the displacement vector, element stresses and support reactions of the problem given in 3(a) 6

4. (a) For the beam and loading shown in figure 2 formulate stiffness matrix and load vector. Take  $E = 200 \text{ GPa}$  and  $I = 4 \times 10^6 \text{ mm}^4$



8

figure 2

- (b) Derive the load vector of uniformly distributed load of intensity 'p' on a 2-noded beam element
- 4
5. (a) Derive the stiffness matrix for CST element
- 6
- (b) Using 2x2 rule, integrate  $x^2 + xy^2$  in the domain  $x = [-1, 1]$  and  $y = [-1, 1]$
- 6
6. (a) Find the inverse of the Jacobian of a 4-noded tetrahedron element with nodes at  $(2,1,1)$ ,  $(3,2,1)$ ,  $(0,3,2)$  and  $(1,2,3)$ .
- 6
- (b) Find the strain displacement matrix of the problem given in 6(a)
- 6
7. A composite wall consists of three material as shown. The outer temperature is  $T_0 = 20^\circ\text{C}$ . Convection heat transfer take place on the inner surface of the wall with  $T_\infty = 800^\circ\text{C}$  and  $h = 25 \text{ W/m}^2\text{C}$ . Determine the temperature distribution in the wall.
- 12

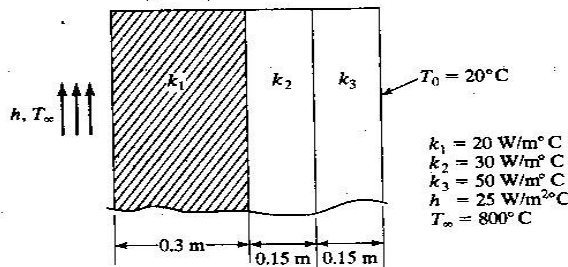
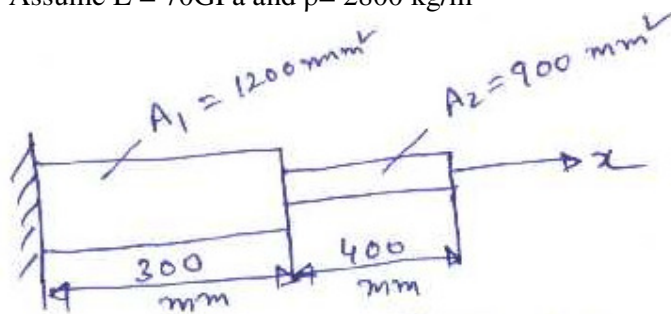


figure 3

6

8. (a) Formulate stiffness and mass matrices of a stepped bar system shown in the figure 3. Assume  $E = 70 \text{ GPa}$  and  $\rho = 2800 \text{ kg/m}^3$



6

figure 4

- (b) Find the natural frequencies of stepped bar system mentioned in problem 8(a)

6

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**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI  
(AUTONOMOUS)****I M.Tech. II Semester Supplementary Examinations, July-2017****WIRELESS COMMUNICATION & NETWORKS  
(DECS)**

Time: 3 Hours

Max Marks:60

Answer any FIVE questions  
All questions carry EQUAL marks

1. (a) Explain the Evolution of Wireless networks with Diagram?  
(b) Draw the Common Channel Signalling (CCS) Network Architecture and Explain it?
2. (a) Write a short note on RAM Mobile Data (RMD)?  
(b) Compare The TDMA, FDMA and CDMA?
3. (a) What are the strategies used for CSMA?  
(b) Define the Near-Far Problem? How to avoid Near-Far Problem in CDMA?
4. (a) Draw the Block Diagram of DSSS Receiver and Explain it?  
(b) Explain frequency hopped spread spectrum system?
5. (a) Describe the operation of mobile IP with a neat diagram?  
(b) Draw the WAP Protocol Stack and Explain it?
6. (a) Explain about Wireless Session Protocol with Parameters and primitives?  
(b) Draw the Registration Request Form of WAP and Explain it?
7. (a) Compare the Infrared LANs, Spread spectrum LANs and Narrow band microwave LANs?  
(b) Explain the requirements of wireless LAN?
8. (a) Explain the Logical link control and adaptation protocol of Bluetooth?  
(b) Discuss about WPAN?

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI  
(AUTONOMOUS)**

**I M.Tech. II Semester Regular Examinations, July-2017**

**FLEXIBLE AC TRANSMISSION SYSTEMS  
(PED)**

Time: 3 Hours

Max Marks:60

Answer any FIVE questions  
All questions carry EQUAL marks

1. (a) Explain basic types of FACTS Controllers. (6M)  
(b) What are the benefits of FACTS Controllers. (6M)
2. Explain the improvement of the following with Shunt compensation (i) Transient stability (ii) Power oscillation damping (12M)
3. Explain the working of TCR, TSC and FC-TCR type VAR Generators. (12M)
4. (a) Explain the working of switching converter type VAR Generator. (6M)  
(b) Compare SVC with STATCOM. (6M)
5. Explain the working of GCSC in detail (12M)
6. (a) Explain the basic objectives of series compensation (6M)  
(b) Explain the working of variable impedance type series compensators (6M)
7. Explain continuously controllable thyristor tap changers . (12M)
8. Explain the real and reactive power flow control by phase angle regulator. (12M)

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI  
(AUTONOMOUS)****I M.Tech. II Semester Regular Examinations, JULY, 2017****LOW POWER VLSI DESIGN  
ELECTRONICS AND COMMUNICATION ENGINEERING  
(VLSI System Design)**

Time: 3 Hours

Max Marks:60

Answer any FIVE questions  
All questions carry EQUAL marks

- |        |                                                                                                                                 |     |
|--------|---------------------------------------------------------------------------------------------------------------------------------|-----|
| 1. (a) | What are the different technical parameter issues connected with VLSI Low Power, Low Voltage design? Explain                    | 6M  |
| (b)    | What are the advantages of SOI technology?                                                                                      | 6M  |
| 2. (a) | Briefly explain Advanced Isolation techniques in Bi CMOS technology                                                             | 6M  |
| (b)    | How isolation in Bi CMOS structures is carried out? Explain                                                                     | 6M  |
| 3. (a) | Explain about Ebers Moll Bipolar model and its advanced model in detail                                                         | 6M  |
| (b)    | Write a short note on MOSFET Spice Models                                                                                       | 6M  |
| 4.     | Explain Isolation Techniques in MOS                                                                                             | 12M |
| 5. (a) | Explain Future trends and directions of CMOS/Bi CMOS processes.                                                                 | 6M  |
| (b)    | Explain the key steps for Deep submicron processes                                                                              | 6M  |
| 6.     | Draw the circuit for High – performance complementary coupled Bi CMOS circuit of three input NAND gate and explain its working. | 12M |
| 7. (a) | Explain extraction of experimental characterization of sub-half micron MOS devices                                              | 9M  |
| (b)    | Explain how MOSFET behaves in a Hybrid mode environment                                                                         | 3M  |
| 8.     | Explain                                                                                                                         |     |
| (a)    | Quasi-CBiCMOS & ESD-free Bi CMOS                                                                                                | 5M  |
| (b)    | Chemical mechanical polishing.                                                                                                  | 4M  |
| (c)    | Limitations of the MOSFET                                                                                                       | 3M  |

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI  
(AUTONOMOUS)****I M.Tech. II Semester Regular Examinations, JULY, 2017****OBJECT ORIENTED ANALYSIS AND DESIGN  
(Computer Science and Engineering)**

Time: 3 Hours

Max Marks:60

Answer any FIVE questions  
All questions carry EQUAL marks

- |        |                                                                                                    |     |
|--------|----------------------------------------------------------------------------------------------------|-----|
| 1. (a) | What is the importance of modeling?                                                                | 4M  |
| (b)    | What are the basic building blocks of UML?                                                         | 8M  |
| 2. (a) | Explain about the object diagram?                                                                  | 6M  |
| (b)    | Explain about common modeling techniques of object diagrams?                                       | 6M  |
| 3. (a) | What are the interaction diagrams? Explain?                                                        | 6M  |
| (b)    | Draw interaction diagrams for Student registration System?                                         | 6M  |
| 4.     | What is state chart diagram? Draw state chart and Activity diagram for Railway Reservation System? | 12M |
| 5. (a) | Explain the component diagram with example?                                                        | 5M  |
| (b)    | What are the common modeling techniques of deployment diagram?                                     | 7M  |
| 6. (a) | What is the different between state chart diagram and activity diagram explain with an example?    | 6M  |
| (b)    | How to model the lifetime of an object explain with an example                                     | 6M  |
| 7. (a) | Explain the difference between component diagram and deployment diagram                            | 4M  |
| (b)    | What is the significance of deployment diagrams? Draw deployment diagram for ATM                   | 8M  |
| 8. (a) | Explain various phases of Software Development Life Cycle                                          | 6M  |
| (b)    | Explain about the architecture of UML?                                                             | 6M  |

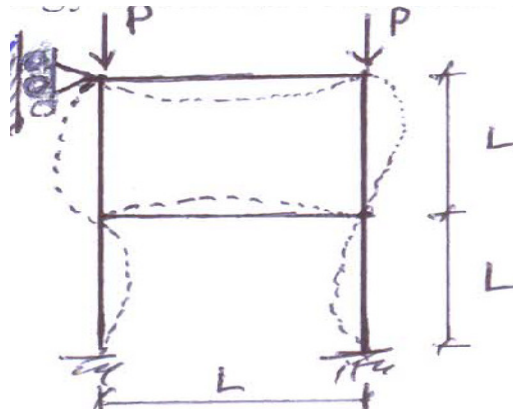
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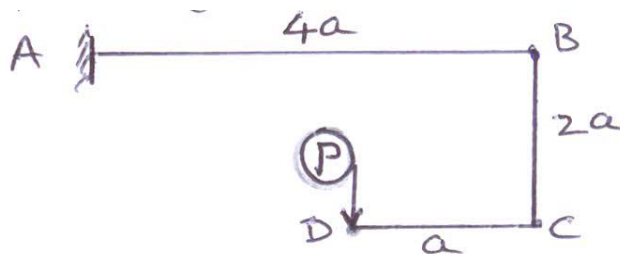
Answer any FIVE questions

All Questions carry Equal Marks

1. a) Derive differential equation of beam column subjected to continuous lateral load and built in ends ? (8M)  
b) Differentiate between elastic and inelastic buckling of columns? (4M)
2. a) Find the critical load of the system using energy method. Assume all members has same modulus of rigidity  $EI$  (Refer: Fig 1) (8M)

**Figure 1**

- b) Write the effect of sway and non sway conditions on buckling of columns? (4M)
3. a) A rigid cantilever frame as shown in figure has constant modulus of rigidity ( $EI$ ) and concentrated load  $P$  at free end. Using energy methods, find the displacements at B, C, D and slope at D. (Refer: Fig2) (6M)

**Figure 2**

- b) What is meant by orthogonality of buckling modes? Derive the relation from general equation of stability? (6M)

4. a) Explain the effect of initial curvature on buckling of bars? (6M)  
b) Write the merits of Energy methods? (6M)
5. a) Briefly explain the salient features of column under critical stress at various end conditions ? (6M)  
b) Explain the role of mathematical treatment for stability of columns? (6M)
6. a) Explain Galerkin method for buckling problems?  
b) Explain role of torsional buckling of I-Section beam subjected to pure bending? (6M)
7. a) Write the empirical formulae used for column design? What are the different Considerations given for column buckling? (6M)  
b) ) A fixed column with initial curvature expressed by the first term of Fourier series  $Z_0(X) = q_0 \sin(\pi x/L)$ . Find the value of shear force V and Q at both the ends. (6M)
- 8 a) Explain elastic buckling of straight at various support conditions of columns? (6M)  
b) Find the expression for deflection, bending of beam column for pinned ends? (6M)



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