

AR16

CODE: 16MTE1013

SET-1

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)

I M.Tech. II Semester Regular & Supplementary Examinations, June-2019

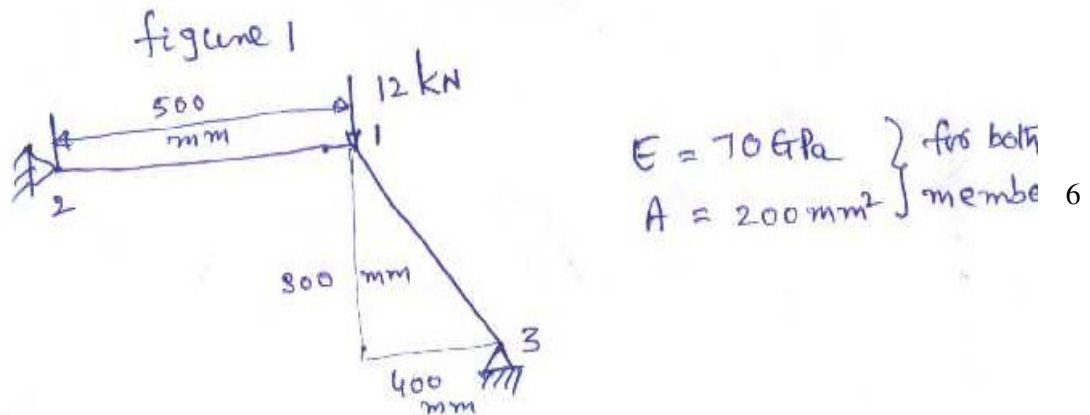
FINITE ELEMENT ANALYSIS (Thermal Engineering)

Time: 3 Hours

Max Marks:60

Answer any FIVE questions
All questions carry EQUAL marks

1. (a) What are the applications of Finite Element Method 6
(b) Discuss variational approach and explain Rayleigh Ritz method. 6
2. (a) What are the properties of stiffness matrix? Explain banded matrix 6
(b) Discuss the penalty approach of handling boundary conditions 6
3. (a) Develop the global stiffness matrix and load vector of the truss shown in the figure 1. 6



- (b) Calculate displacement vector, element stresses and support reactions in problem 3(a). 6

4. (a) Derive any two Hermite shape functions of a 2-noded beam element 6
- (b) Derive the stiffness matrix of a two noded beam element 6
5. (a) Derive the strain displacement matrix [B] of a CST element 6
- (b) Explain Gaussian quadrature 1x1 & 2 x 2 rules 6
6. (a) The displacement vector of four noded quadrilateral $q=[0, 0, 0.2, 0, 0.15, 0.1, 0, 0.05]^T$ 6
mm. The element coordinates are (1,1), (5, 1) , (6, 6) and (1, 4) mm. Find the (x, y)
coordinates of a point where the values of $\xi=0.5$ and $\eta=0.5$
- (b) Find the u,v displacements of the point specified in the above problem 6
7. (a) Derive the conductivity matrix and load vector of a one dimensional fin exposed to a 6
convective environment h and T_∞
- (b) A metallic fin with thermal conductivity $k = 360 \text{ W/m}^\circ\text{C}$, 0.1 cm thick and 10 cm long 6
extends from a plane wall whose temperature is 235°C . Determine the temperature
distribution of the fin when it is exposed to air at 20°C with $h = 9 \text{ W/m}^2\text{C}$.
8. (a) Develop the stiffness matrix and mass matrix of the stepped bar system shown in the 6
figure 2. Take $E = 200 \text{ GPa}$ and $\rho = 7800 \text{ kg/mm}^3$.

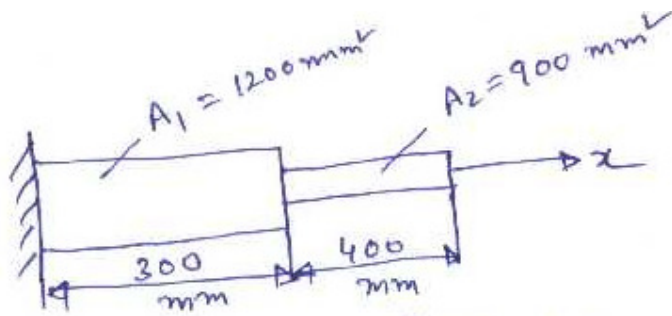


figure 2

- (b) Determine the natural frequencies of the stepped bar system shown in the problem 8(a) 6

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)****I M.Tech. II Semester Regular & Supplementary Examinations, June-2019****FLEXIBLE AC TRANSMISSION SYSTEMS
(PED)**

Time: 3 Hours

Max Marks:60

Answer any FIVE questions
All questions carry EQUAL marks

1. (a) Explain the need for transmission interconnection in power systems (6M)
(b) List out the possible benefits from FACTS controllers. (6M)
2. (a) Explain various objectives of shunt compensation. (6M)
(b) Explain how voltage instability can be prevented with the help of shunt compensation. (6M)
3. Explain the working of STATCOM and compare it with SVC. (12M)
4. (a) Explain the working of TCR with suitable diagrams. (6M)
(b) Explain the operation of FC-TCR type of VAR Generator. (6M)
5. Explain the working of TCSC in detail. (12M)
6. Explain the working of GCSC with suitable diagrams. (12M)
7. Explain the basic operating control schemes of GCSC and TSSC. (12M)
8. Explain the working of continuously controllable thyristor tap changer with suitable diagrams. (12M)

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CODE: 16MCS1012

SET-1

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)

I M.Tech. II Semester Regular & Supplementary Examinations, June-2019

OBJECT ORIENTED ANALYSIS AND DESIGN (Computer Science & Engineering)

Time: 3 Hours

Max Marks:60

Answer any FIVE questions
All questions carry EQUAL marks

1. (a) What is modelling? Explain importance of modelling. 6M
(b) How does object oriented approach is different from traditional top down approach? Explain with an example? 6M
2. (a) What is an association relationship? Explain association qualifier and association class with suitable examples. 4M
(b) Explain modelling techniques for class diagram. 8M
3. (a) Draw the collaboration diagram for the use case "Register" that allows the registration of a new student into a University through Online Registration System. 6M
(b) What is a swim lane? Explain swim lane with suitable example. 6M
4. (a) Define state, event and transition. Draw the state chart diagram for ATM system. 6M
(b) What is an event? With suitable examples, explain how to model events in UML. 6M
5. (a) Illustrate Deployment diagram with the help of its Nodes and Connections. 6M
(b) What are the common uses of deployment diagrams? Draw the deployment diagram for online shopping system. 6M
6. (a) Explain about Activity diagram. 6M
(b) How Forking and Joining will used in Activity diagram. Explain with an example. 6M
7. (a) Explain about the object diagram 4M
(b) Explain the forward and reverse engineering of object diagram with an example. 8M
8. (a) What is a package? Write about the elements of packages 6M
(b) What are the different stereotypes used in dependency relationship among classes and object in class diagrams .Explain 6M

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SET-2

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT-TEKKALI
(AUTONOMOUS)

I M.Tech. II Semester Regular & Supplementary Examinations, June-2019

STABILITY OF STRUCTURES

(Structural Engineering)

Time: 3 Hours

Max Marks: 60

Answer any FIVE questions
All Questions carry Equal Marks

- Explain Euler's theory on stability of columns? What are the assumptions and limitations? (6M)
 - Derive expression for bending of continuous beams with axial load? (6M)
- A beam column subjected to UDL load and axial load as shown in Figure -I.
 - Obtain an expression for maximum bending moment? (6M)
 - Obtain expression for maximum deflection? (6M)

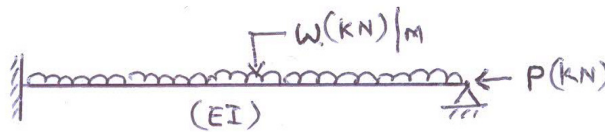


Figure 1

- Compute the critical load of the frame by using energy methods? Assume all members has same modulus of rigidity (EI) ? (Refer Figure 2) (6M)

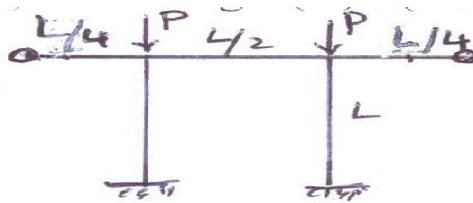


Figure 2

- Compute the critical load of the frame by using energy methods? Assume all members has same modulus of rigidity (EI) ? (Refer Figure 3) (6M)

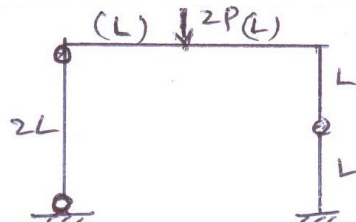


Figure 3

- 4 a) Explain buckling of bar with intermediate compressive forces (6M)
- b) A pin ended 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)
- 5 a) Briefly explain the **effect of shear** during buckling of frames at critical loads? (8M)
- b) Write the empirical formula used for design of beam column? (4M)
- 6 a) Find the critical loads of the beams (Beam 1 & Beam 2) shown in Figure-5 (8M)
(Assume the lengths of each beam L which is supported at mid span)
- b) Compare the results of the above and give your comments? (4M)
- Figure 4:



- 7 a) Briefly explain different types of experiments on column buckling? What are the considerations? (8M)
- b) Write the considerations about design of columns based on buckling? (4M)
- 8 a) Derive differential equation for lateral buckling of columns under pure bending? (6M)
- b) Explain Timoshenko method for buckling problems? (6M)

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)****I M.Tech. II Semester Supplementary Examinations, June-2019****LOW POWER VLSI DESIGN
(VLSI System Design)****Time: 3 Hours****Max Marks:60****Answer any FIVE questions
All questions carry EQUAL marks**

- | | | | |
|----|-----|---|-----|
| 1. | (a) | Discuss in brief about design limitations of Low voltage, Low power. | 6M |
| | (b) | With neat sketches explain the Analog/Digital BiCMOS process. | 6M |
| 2. | (a) | List the advantages of Oxide-isolated Bipolar transistors. Draw and explain step by step process of Oxide-isolated Bipolar transistors. | 6M |
| | (b) | Explain in detail about shallow trench isolation process flow using a doped oxide as the diffusion source. | 6M |
| 3. | (a) | Explain the device structure and fabrication process of Low voltage, Low power lateral BJT on SOI. | 6M |
| | (b) | Write short notes on future trends and directions of CMOS/BiCMOS process. | 6M |
| 4. | (a) | Discuss how LEVEL-3 model deal with short and narrow channel effects. | 6M |
| | (b) | Explain about HICUM model and its features. | 6M |
| 5. | (a) | Explain the effect of temperature on Hybrid-mode device threshold voltage model. | 6M |
| | (b) | Explain device parameters when MOSFET is operated in hybrid-mode that effect I-V characteristics. | 6M |
| 6. | (a) | Draw and explain with I-V of common emitter BiCMOS driver configuration. | 6M |
| | (b) | Draw the schematic FS-BiCMOS and explain its working. | 6M |
| 7. | | With schematic compare different configuration of QC-BiCMOS digital circuit in terms of performance. | 12M |
| 8. | (a) | What is pipelining theme in flip-flop. Explain the working of CMOS flip-flop. | 6M |
| | (b) | What are the advantages of Dynamic flip-flop. Explain the working of 2-input NOR active high latch | 6M |