Code No: 13MTE1013

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)

I M.Tech. II Semester Regular/ Supplementary Examinations, AUGUST – 2015

FINIT ELEMENT ANALYSIS
(Thermal Engineering)

Time: 3 Hours **Max Marks: 60**

Answer any FIVE questions
All questions carry equal marks

1. a) Derive the shape functions for Linear and quadratic system of 1Dimensional Structural element.
   b) At 20ºC an axial load P = 300×10^3N is applied to the rod as shown in **Fig.1**. The temperature is then raised to 60ºC. Assemble the element stiffness matrix and the element temperature force matrix (F). Again determine the nodal displacements and element stresses by considering linear and Quadratic Shape functions. Also find element strains. Assume $E_1 = 70 \times 10^9$ N/m^2, $A_1 = 900$ mm^2, $\alpha_1 = 23 \times 10^{-6}$/ºC, $E_2 = 200 \times 10^9$ N/m^2, $A_2 = 1200$ mm^2, $\alpha_2 = 11.7 \times 10^{-6}$/ºC.

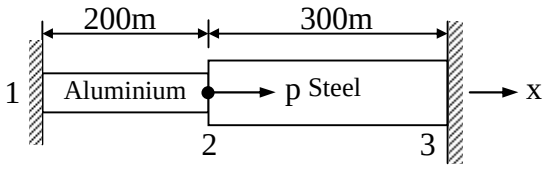

Fig. 1

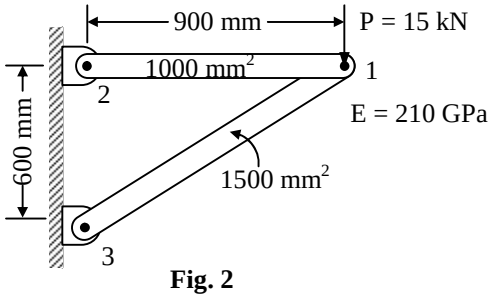

Fig. 2

2. a) Explain the following methods used for the formulation of element characteristics and load matrices.
   i) Variational approach ii) Weighted residual approach
   b) For the pin jointed configuration shown in **Fig.2**, determine;
   i) Element stiffness matrices ii) Global stiffness matrix iii) Stress in the element 1
   iv) Strain in the element 2 v) Strain energy of the system vi) Any one of the support reaction.

3. a) Establish the Hermite shape functions for a beam element Derive the equivalent nodal point loads for a u.d.l. acting on the beam element in the transverse direction.
   b) Establish the stiffness matrix for a BEAM element Derive the equivalent nodal point loads.

4. a) Derive the stress-strain and strain displacement relations for (i) plane stress, (ii) plane strain and (iii) axi-symmetric solids.
   b) For the configuration shown in **Fig.3**, determine the deflection at the point of load application using one element model. The 'B' matrix relating strain-model displacement and the 'D' matrix relating stress-strain are given below. Thickness = 10 mm, E = 70 GPa, $\mu = 0.3$

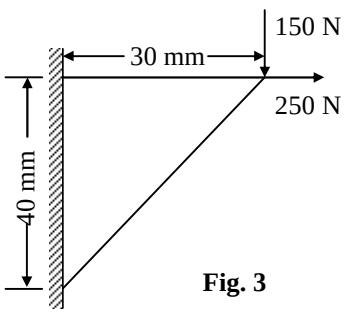

Fig. 3

Code No: 13MTE1013

5. a) Derive the B matrix relating the strains and the nodal displacements for an Axi-symmetric triangular finite elements.Derive the shape functions for beam element

   b) Using a 2 × 2 rule, evaluate the integral $\int\int_{\Omega}(x^2 + xy^2 + y^2 + yx^2)\,dx\,dy$ by Gaussian quadrature where Ω denotes the region shown in **Fig.4**.

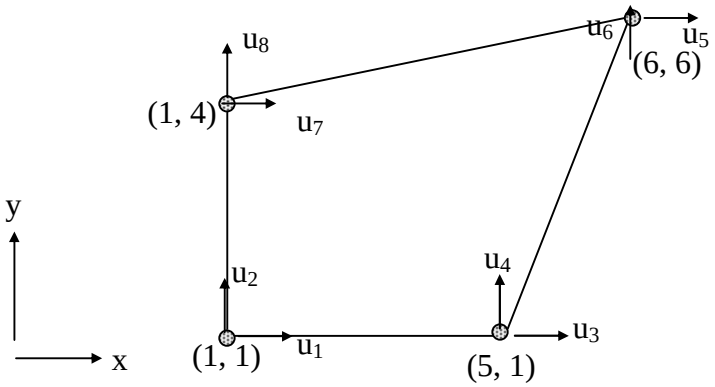

Fig. 4

6. a) Determine the temperature distribution in a straight fin of circular c/s. Use three one dimensional linear elements and consider the tip is insulated. Diameter of fin is 1 cm, length is 6 cm, h = 0.6 W/cm^2 –C, ϕ_∞=25^{0}C and base temperature is ϕ_1=80^{0}C.

   b) A long bar of rectangular cross section, having thermal conductivity of 1.5 W/m-^{0}C is subjected to the boundary conditions as shown in **Fig.5** Two opposite sides are maintained at a uniform temperature of 180^{o}C, one side is insulated, and the remaining side is subjected to a convection process with Ta = 250^{o}C and h=50W/m^2-^{0}C. Determine the temperature distribution in the bar.

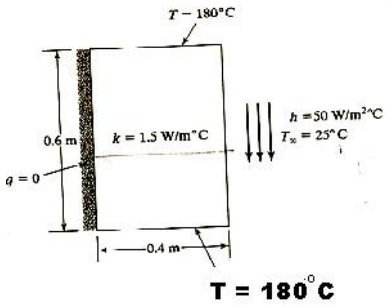

Fig. 5

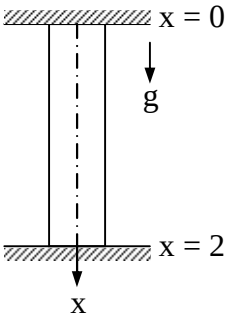

Fig. 6

7. a) Discuss in detail about the concepts of FEM formulation. How is that FEM emerged as powerful tool. Discuss in detail about applications of finite element method

   b) Derive an equation for finding out the potential energy by Rayleigh-Ritz method. Using Rayleigh-Ritz method, find the displacement of the midpoint of the rod shown in **Fig.6**. Assume E = 1, A = 1, ρg = 1 by using linear and quadratic shape functions concept.

8. a) Derive the shape functions for four noded tetrahedron element for solving 3 D Problems.

   b) Consider axial vibration of the steel bar shown in **Fig.7**, (i) develop the global stiffness and mass matrices and (ii) determine the natural frequencies and mode shapes using the characteristic polynomial technique.

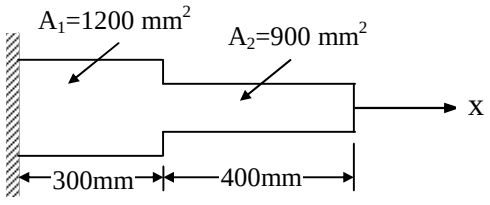

Fig. 7

AR13 **Set-01**

Code No: 13MDE1005

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT,TEKKALI
(AUTONMOMOUS)
I M.Tech II Semester Regular / Supplementary Examinations, August-2015
OPTICAL COMMUNICATION
(Digital Electronics and Communication Systems)

Time: 3 hours **Max Marks: 60**

Answer Any FIVE questions
All questions carry equal mark

1 a) Describe the basic block diagram of a optical communication system and explain how it differs from conventional co-axial cable communication system. (8M)
b) Determine the normalized frequency at 0.82 µm for a step index fiber having 25 µm core radius, n1 = 1.48 and n2 = 1.46. How many modes propagate in this fiber at 0.82 µm? (4M)

2 a) Discuss in detail Fiber splicing (7M)
b) Explain semiconductor optical amplifiers (5M)

3. a) Describe SONET (6M)
b) Explain optical sensors (6M)

4. a) With the help of a suitable block diagram explain the functioning of every element of a fiber optic receiver (6M)
b) Describe the principle of wavelength division Multiplexing for optical Communication links (6M)

5. a) Give an account of direct intensity modulation (6M)
b) Explain optical amplifiers (6M)

6. a) Derive internal quantum efficiency of LED (6M)
b) Draw the schematic of surface emitting LED and discuss the characteristics of such LED. (6M)

7. a) Explain isolators (6M)
b) Describe optical CDMA (6M)

8) Draw the structures of single and multimode step index fibers and graded index fiber with typical dimensions. (12M)

****

AR13 **Set-01**

13MIT1009

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(Autonomous)

I M.Tech II Semester Regular / Supplementary Examinations, August-2015

MACHINE LEARNING

(Information Technology)

Time: 3 Hours **Max Marks: 60**

Answer any Five Questions.

All Questions carry equal marks

1. Illustrate the issues in designing a learning system with suitable example. Justify each issue with respect to that example.

2. What is Inductive Bias? Explain with suitable example.

3. Explore the need to consider Decision Tree learning algorithm. Validate it with suitable example

4. Define artificial neural network (ANN). What are different ways to represent ANN. Explain pros and cons of each representation?

5. What is Brute force Bayes learning? Describe Brute force map learning algorithm

6. Explain K-Nearest Neighbor learning algorithm with suitable example

7. What is first order Rule? Give an example. How do you frame learning sets of First order rules?

8. Analyse the concept of Inductive-Analytical approach with respect to Learning and searching functionalities

******

SET-1

AR13

Code No: 13MPE1011

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)

I M. Tech. II Semester Regular/ Supplementary Examinations, AUGUST – 2015

Flexible AC Transmission Systems
(Power Electronics & Electric Drives)

Time : 3 hours **Max Marks :60**

Answer any FIVE questions
All questions carry equal marks

1	a)	What are the basic types FACTS controllers? Explain	[8 M]
	b)	What are the factors limiting the loading capability of a transmission system?	[4 M]
2		How the following objectives are achieved using FACTS devices?	
	a)	End of line voltage support.	[3 M]
	b)	Transient stability improvement	[6 M]
	c)	Power oscillation damping	[3 M]
3	a)	What are the benefits of regulation slope in compensating devices?	[4 M]
	b)	Differentiate between the V-I, V-Q characteristics of SVC and STATCOM	[8 M]
4	a)	Explain with the help of neat diagrams, the operation of Thyristor Controlled Reactor type static var compensator for different firing angles?	[9 M]
	b)	What are the different types of techniques used to control the harmonic in TCR type var compensators.	[3 M]
5	a)	Explain the operating principle of switching converter type var compensator.	[6 M]
	b)	Explain any one type of control approaches adopted in switching converter type var compensator.	[6 M]
6	a)	Explain the concept of series capacitive compensation.	[6 M]
	b)	Briefly explain the internal control scheme for GCSC.	[6 M]
7	a)	Explain the SSR handling in TCSC.	[6 M]
	b)	Explain the external control concepts of series compensators.	[6 M]
8	a)	Explain, How power flow is controlled in TCVAR?	[6 M]
	b)	Explain the continuously controllable thyristor tap changer.	[6 M]

***

AR13 **Set-02**

CODE: 13MVL1011

ADITY INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I M.Tech II Semester Regular / Supplementary Examinations, August-2015

LOW POWER VLSI DESIGN
(VLSI System Design)

Time: 3 Hours **Max. Marks: 60**

Answer any five questions
All questions carry equal marks

1.	a) Explain about sources of power dissipation in digital integrated circuits	6M
	b) What are the advantages and limitations of SOI technology	6M
2.	a) Elaborate on Isolation in Bipolar Transistors	6M
	b) Explain about SOI CMOS/BiCMOS VLSIs	6M
3.	a) what are the Future Trends and Directions of CMOS/BiCMOS Processes	6M
	b) explain about HICUM Model	6M
4.	Explain about Advanced MOSFET Models	12M
5.	a) Elaborate on Conventional CMOS Logic Gates	6M
	b) With neat diagram explain the operation of Bi CMOS NAND gate	6M
6.	a) explain about Full Voltage Swing MBiCMOS Logic Gate	6M
	b) write short note on LEVEL 1 and LEVEL 2 models	6M
7.	a) explain about The Optimization Theme for Flip Flops	6M
	b) Elaborate on Single Edge-Triggered Flip-Flops	6M
8.	Write shot note on the following o Compare CMOS and Bi polar technologies o ESD free Bi-CMOS	12M

****

AR13 **Set-02**

CODE: 13MCS1009

ADITY INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I M.Tech II Semester Regular / Supplementary Examinations, August-2015
OBJECT ORIENTED ANALYSIS AND DESIGN
(Computer Science and Engineering)

Time: 3 hours **Max Marks: 60**

Answer Any FIVE questions
All questions carry equal mark

1. (a) Explain briefly the advantages of Object Orientation. [6M]
   (b) Describe about UML Conceptual model. [6M]

2. Differentiate between Structural Modeling and Behavioral Modeling. [12M]

3. (a) Explain about Use Case Modeling with an example. [6M]
   (b) Illustrate about the terms and concepts of an Activity diagram. [6M]

4. (a) Explain briefly about the Analysis class diagram with an example. [6M]
   (b) Discuss about the stereotypes in class diagrams with an example. [6M]

5. Write a short notes on the following:
   (i) Generalization (ii) Aggregation
   (iii) Composition (iv) Association class [4x 3M=12M]

6. (a) Explain in detail about State chart diagram with an example. [6M]
   (b) Differentiate between Sequence and collaboration diagrams. [6M]

7. (a) Explain about object diagram. [6M]
   (b) Explain about the terms and concepts of Design Class diagram. [6M]

8. Write Short notes on
   (i) USDP (ii) CRC (iii) Packages and Interfaces (iv) Patterns [4x 3M=12M]

****