Code No: 13MTE1013
### ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
### I M.Tech. II Semester Regular/ Supplementary Examinations, August–2016

FINIT ELEMENT ANALYSIS
(THERMAL ENGINEERING)
Time: 3 Hours   **Max Marks: 60**

Answer any FIVE questions
All questions carry equal marks

1. a) Explain the following methods used for the formulation of element characteristics and load matrices: i) Variational approach   and   ii) Weighted residual approach
   b) For the truss shown in fig. 1 determine the displacements at point B and stresses in the bars by considering linear and quadratic shape functions.
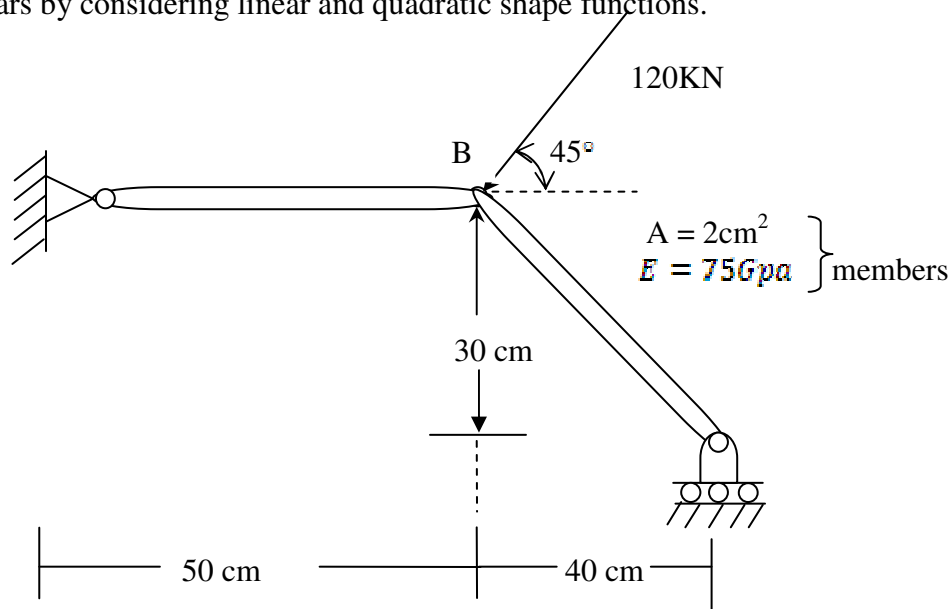
Fig. 1

2. a) For the Aluminum bar shown in Fig.2, (i) develop the global stiffness and (ii) determine the nodal displacements and stresses using elimination approach and with help of linear shape function concept. Assume Young's Modulus E= 70 GPa.
   b) Determine the stiffness matrix for truss element with an example.
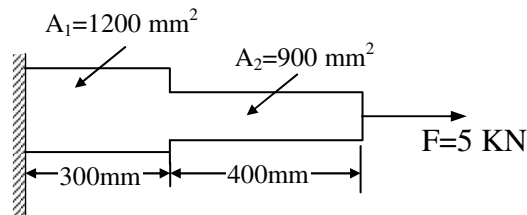
Fig. 2

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3. Find the deformed configuration, and the maximum stress and minimum stress locations for the rectangular plate loaded as shown in the Fig. 3. Solve the problem using 2 triangular elements. Assume thickness = 10cm; E = 70 Gpa, and $\upsilon = 0.33$.
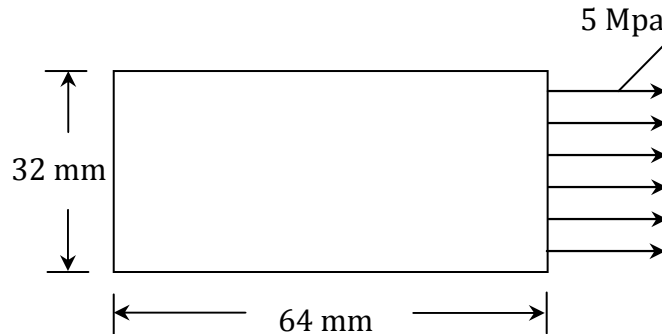

Fig. 3

4. a) Determine the shape functions for 4 – nodded quadrilateral element.
    b) For a beam and loading shown in Fig.4, determine the slopes at 2 and 3 and the vertical deflection at the midpoint of the distributed load.
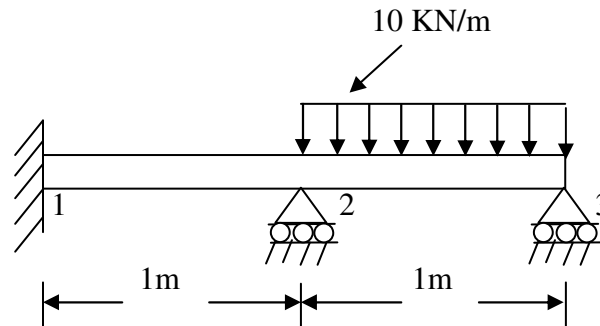

Fig.4

5. a) Derive one dimensional steady state heat conduction equation.
    b) 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, $\phi_\infty = 25^0$C and base temperature is $\phi_1 = 80^0$C.

6. 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) Explain FE formulation of a two dimensional heat conduction equation for composite walls.

7. a) Determine the element equations for the plane stress element shown in Fig.5. The element has a 20 N/cm^2 load acting perpendicular to side jk and is subjected to a 15°C temperature rise.

    Thickness of the element = 2 cm;   E = 6 × 10^6 N/cm^2
    $\alpha = 7 \times 10^{-6}$ cm/cm °C; $\mu = 0.25$
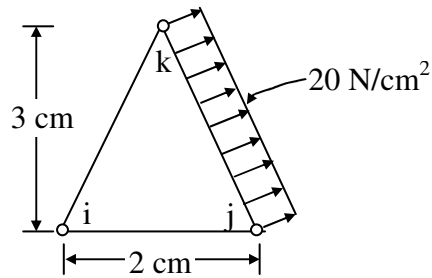
Fig.5

b) Obtain the shape functions of four nodded Tetragonal. Also discuss about the importance of this element in 3 D formulations of FEA problems.

8. a). Consider axial vibration of the steel bar shown in Fig.6, (i) develop the global stiffness and mass matrices and (ii) determine the natural frequencies and mode shapes using the characteristic polynomial technique.
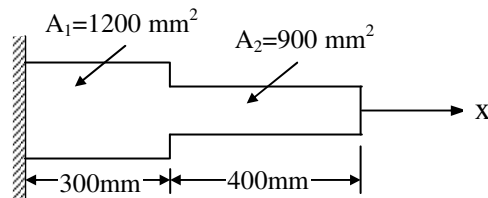

Fig. 6

b) Write the shape functions of four nodded quadrilateral. Also discuss about the importance of Isoparametric formulations.

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Code No: 13MDE1005
ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I M.Tech. II Semester Regular/ Supplementary Examinations, August–2016

OPTICAL COMMUNICATION
(Digital Electronics & Communication Systems)

Time: 3 Hours   **Max. Marks: 60**
Answer any Five Questions
All questions carry EQUAL marks

1. (a) Explain the advantages & disadvantages of optical communication.
   (b) Determine the maximum radius allowed for a fiber having core refractive index 1.47 & cladding refractive index 1.46. The fiber is to support only one mode at wavelength of 1300 nm. (6M+6M)
2. (a) Determine the number of modes propagate at 1300nm wave length in a step index fiber having core radius of 25µ, core refractive index is 1.48 and cladding refractive index is 1.46. What percentage of optical power flow in the cladding region.
   (b) Explain how light propagates in step index and graded index fiber. (6M+6M)
3. (a) Explain about the quantum efficiency in LED.
   (b) With the help of the structure explain single mode Laser diode working details.
   (6M+6M)
4. (a) Discuss the various Noise sources in PIN photo diode receiver.
   (b) With a neat diagram explain the working of Avalanche photo diode. (6M+6M)
5. (a) Write short notes on
       (i) Fiber optic couplers
       (ii) Fiber optic switches.
   (b) Explain about adhesive splices and multiple splices. (6M+6M)
6. (a) Describe with relevant diagram about the signal path through optical data link via transmitter, fiber & receiver giving the nature of the signal wave form.
   (b) Explain about RZ and NRZ coding and their effects on the bit rate. (6M+6M)
7. (a) Explain in detail about WDM system.
   (b) Explain the concept of link power budget analysis. (6M+6M)
8. (a) Write short notes on
       (i) SONET
       (ii) OPTICAL CDMA
   (b) Explain the function and the principle of operation of Isolator. (6M+6M)

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Code No: 13MPE1011
ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I M.Tech. II Semester Regular/ Supplementary Examinations, August–2016

FLEXIBLE AC TRANSMISSION SYSTEMS
(Power Electronics and Electric Drives)
Time: 3 Hours　　　　　　　　　　　　　　　　　　　　　　**Max Marks: 60**
Answer any FIVE questions
All questions carry EQUAL marks

1. a) What are the limits on loading of transmission line?　　　　　　　　[6M]
    b) What are the basic types of FACTS controllers　　　　　　　　　　[6M]

2. a) Discuss the improvement of transient stability with static shunt compensation　[6M]
    b) Explain power oscillation damping with static shunt compensation　　[6M]

3. Explain about Thyristor Controlled Reactor in detail.　　　　　　　　[12M]

4. What are the different types of controllable var generators? Describe the hybrid VAr
    generators with neat diagrams?　　　　　　　　　　　　　　　　　[12M]

5. Explain the working of SSSC with neat diagrams　　　　　　　　　　[12M]

6. a) Explain about the operation of Thyristor switched Series Capacitor (TSSC).　[6M]
    b) Discuss basic operating control scheme for TCSC　　　　　　　　[6M]

7. Explain midpoint voltage compensation .　　　　　　　　　　　　　[12M]

8. Explain power flow control by phase angle regulator　　　　　　　　[12M]

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Code No: 13MVL1011
ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I M.Tech. II Semester Regular/ Supplementary Examinations, August–2016

LOW POWER VLSI DESIGN
(VLSI System Design)

Time: 3 hours   Max. Marks: 60

Answer any FIVE questions
All questions carry equal marks

1.	a)	What are the difference problems associated with Low Power VLSI Design? Discuss	[6M]
	b)	Explain about SOI Technology with necessary sketches.	[6M]
2.	a)	Draw the structure for optimized twin – Well BI CMOS structure with self aligned p and buried layers for improved packing density and explain about the same.	[6M]
	b)	What are the BICMOS manufacturing and integration considerations? Explain	[6M]
3.	a)	What are the steps in implementing copper metallization in deep sub micros process? Explain.	[6M]
	b)	Draw the stick diagram and layout of CMOS inverter?	[6M]
4.	a)	Explain about Gummel poon Bipolar model and its advanced model in detail.	[6M]
	b)	Explain in detail about EKV model for advanced MOSFETS with neat sketches.	[6M]
5.		What are the experimental characteristics of sub-half micron MOS devices? Explain how to extract them.	[12M]
6.	a)	Explain about LEVEL 3 Model MOSFETS	[6M]
	b)	Write short note on:	[6M]
		(i) properties of fully depleted SOI MOSFETS	
		(ii) What are the limitations of the MOSFET characteristics?	
7.	a)	Explain the need for Input protection in BICMOS digital circuit that do not use the input protection circuit.	[6M]
	b)	Compare the following BICMOS logic gates CCBICMOS, FSBICMOS, FSCMBL and CIBICMOS circuits with respect to speed, area and power dissipation?	[6M]
8.	a)	Explain about the pipelining theme and high performance and low power theme for latches and flip flops.	[6M]
	b)	Write notes on:	[6M]
		i) ESD – free BICMOS circuits	
		ii) Quality measures for Flip-Flops	

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CODE: 13MCS1009

ADITY INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I M.Tech. II Semester Regular/ Supplementary Examinations, August–2016

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) A modify is a simplification of reality" justify [6M]
   (b) Discuss the merits and demerits of UML [6M]

2. Create a class diagram for edit option in word processor diagram [12M]

3. (a) Discuss the advanced classes with examples [6M]
   (b) Discuss the advanced relationships with examples [6M]

4. For the following scenario, draw the use case diagram which should include extends and include relationships.

   The driver starts her car and logs into the onboard route assistant upon successful login, the driver specifics the planning service and the name of the trip to be executed. The onboard route assistant obtains the list of destinations, directions, segments and crossing from the planning service .given the current position, the route assistant provides the driver with the nest set of direction .The driver arrives to destination and shuts down the route assistant [12M]

5. (a) Create a sequence diagram for an ATM machine [6M]
   (b) Draw the activity diagram for railway reservation system [6M]

6. (a) Compare processes and threads [6M]
   (b) Describe the time and space for any real time system [6M]

7. (a) Analyze the common modeling techniques for component diagrams [6M]
   (b) Analyze the common modeling techniques for deployment diagrams [6M]

8. In detail explain about system and model using library management system [12M]

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Code No: 13 MSE1013   **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
M.Tech.II Semester Regular Examinations,August-2016

STABILITY OF STRUCTURES

(STRUCTURAL ENGINEERING)

Time: 3hours   **Max Marks:60**
Answer any FIVE questions
All questions carry equal marks

1.	(a)	Derive the equation for Beam column with concentrated loads	(6M)
	(b)	Write about the application of trigonometric series with graphical representation	(6M)
2.		Explain the elastic buckling of straight columns with Euler's formula	(12M)
3.		Write about the differential settlements of columns using different supports and different loading conditions	(12M)
4.	(a)	What are energy methods explain with an example	(6M)
	(b)	Explain in detail regarding eccentrically loaded column	(6M)
5.		What is critical stress diagram and design the column under various load condition	(12M)
6.	(a)	Write about Timoshenko method and parameters to be designed in column	(6M)
	(b)	Explain buckling problem orthogonality relation	(6M)
7.		Determine the differential equation for lateral buckling of simply supported beam	(12M)
8.		Determine buckling of rectangular cross section subjected to pure bending	(12M)

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