Code No: 16MTE1013
ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I M.TECH. II Semester Regular & Supplementary Examinations, August-2018
FINITE ELEMENT ANALYSIS
(Thermal Engineering)

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

1.
     a. Write the stress equilibrium equations, if the stresses acting on the elemental volume dv are $\sigma = [\sigma_x, \sigma_y, \sigma_z, \tau_{xy}, \tau_{yz}, \tau_{zx}]^T$ and the distributed force per unit volume, vector f = $[f_x, f_y, f_z]^T$ [6M]

     b. Determine the displacements of the nodes of the spring system Shown in the Fig.1. if, $K_1 = 40$ N/mm, $K_2 = 50$ N/mm, $K_3 = 60$ N/mm, $K_4 = 80$ N/mm, $F_1 = 100$ N and $F_2 = 150$ N.   [6M]
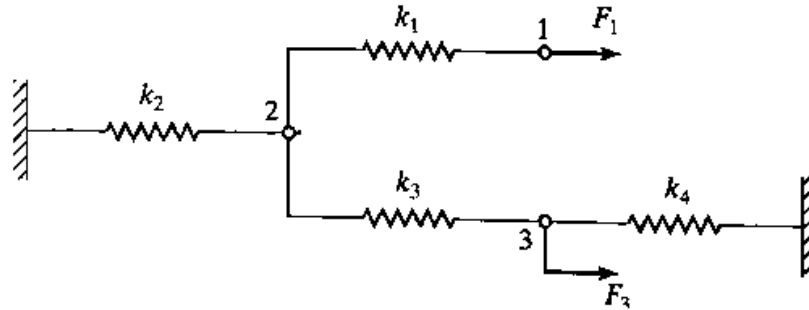

Fig. 1

2. Determine the
     a. Nodal deflections
     b. Stresses in each member
     c. Reactions at the supports, For the member shown in the Fig 2.
     Given that, $E_1 = 2 \times 10^5$ Mpa, $E_2 = 1 \times 10^5$ MPa and P = 1000 N   [12M]
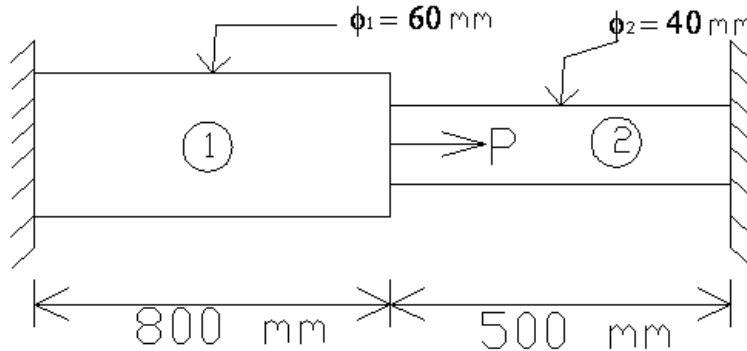

Fig .2

1 – 3

3. The plane truss shown in Figure 3 is composed of members having a square 15 mm × 15 mm cross section and modulus of elasticity $E = 69$ GPa. Find
   a. Assemble the global stiffness matrix.
   b. Compute the nodal displacements in the global coordinate system for the loads shown.
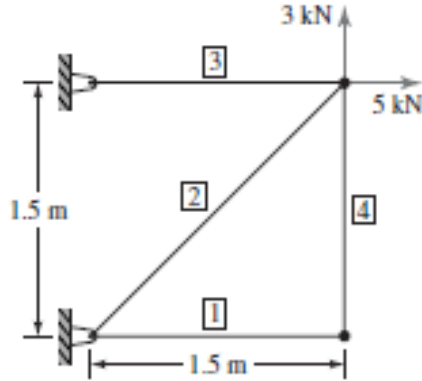   c. Compute the axial stress in each element.   [12M]

Fig. 3

4. For a triangular plate shown in the figure 4, determine the deflection at the point of load using one triangular element. Thickness is 10mm, E = 70×10^3 MPa, μ = 0.3   [12M]
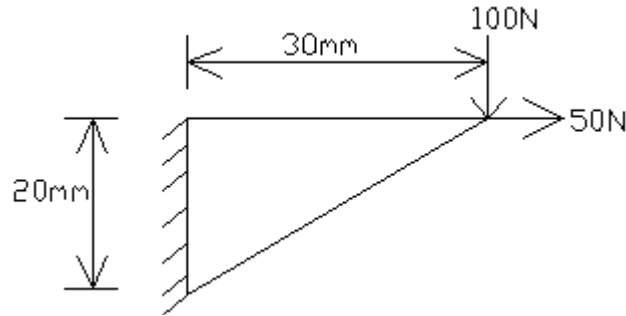

Fig. 4

5. Consider a rectangular element as shown in the Fig. 5. Assume plane stress condition, E = 200×10^3 MPa, μ = 0.3 and q = $[0,0,0.2,0,0.15,0.10,0,0.05]^T$. Evaluate J, B and σ at ξ = 0 and η = 0.   [12M]
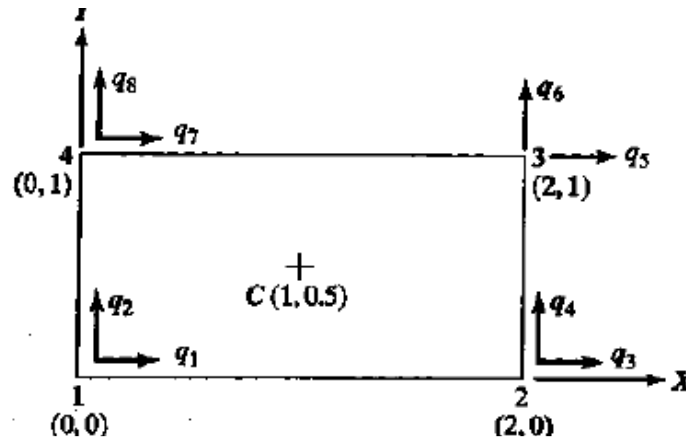

Fig. 5

6. Find the deflection at the load and slopes at the supports for the steel shaft shown in the Fig. 6. Consider the shaft is simply supported at bearings A and B. E = 200GPa.

[12M]

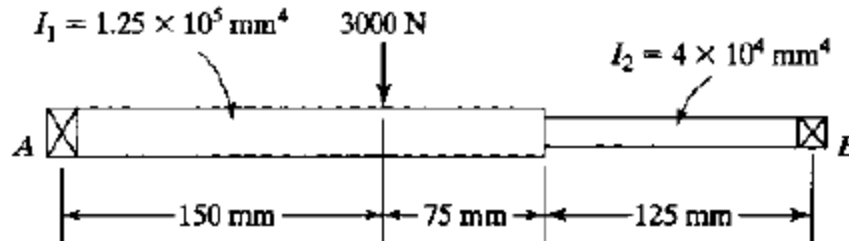$I_1 = 1.25 \times 10^5 \text{ mm}^4$ 3000 N $I_2 = 4 \times 10^4 \text{ mm}^4$

A   B

—150 mm—   —75 mm—   —125 mm—

Fig. 6.

7. A composite wall consists of three materials, as shown in the Fig. 7. The outer temperature is $T_0 = 20^0$ C. Convection heat transfer takes place on the inner surface of the wall with $T_\infty = 800^0$C and h=25W/m^2.^{0}C. Determine the temperature distribution, if $K_1 = 20$ W/m $^\circ$C, $K_2 = 30$ W/m $^\circ$C, $K_3 = 50$ W/m $^\circ$C. [12M]

h, T_∞ k_1 k_2 k_3
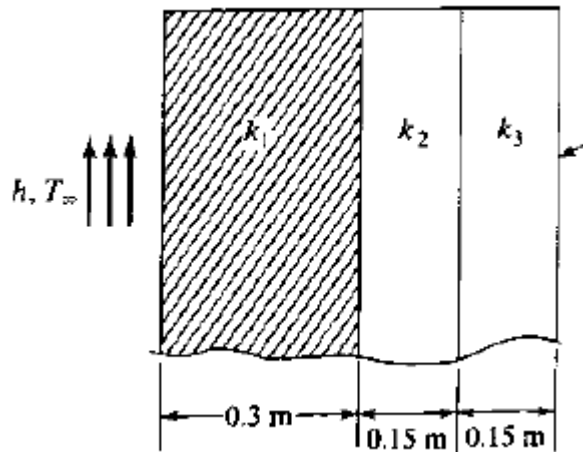
—0.3 m— |0.15 m|0.15 m|

Fig. 7.

8 Consider axial vibration of the steel bar shown in Fig.8, (i) develop the global stiffness and mass matrices and (ii) determine the natural frequencies and mode shapes using the characteristic polynomial technique. Take E = 200GPa, ρ = 7840kg/m3 [12M]

A_1=1200 mm^2 A_2=900 mm^2
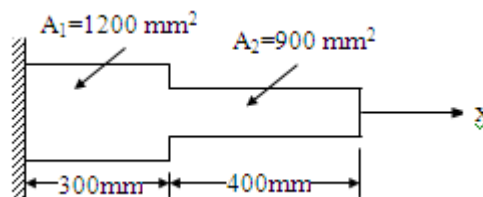
—300mm—   —400mm—   X

Fig. 8

3 – 3

AR16   Set-01

Time: 3 Hours   Max Marks: 60

Answer any FIVE questions
All questions carry EQUAL marks

1. a) Explain the need for transmission interconnections in power system   [6M]
   b) What are the benefits of FACTS Controllers   [6M]

2. What are the objectives of shunt compensation? Explain how power oscillation damping is improved with shunt compensation?   [12M]

3. a) Explain the differences between SVC and STATCOM   [6M]
   b) Explain about regulation slope.   [6M]

4. What are the different types of controllable var generators? Explain Thyristor Switched Capacitor (TSC) in detail   [12M]

5. Explain about GTO thyristor controlled series capacitor (GCSC)?   [12M]

6. Explain internal control scheme for SSSC.   [12M]

7. a) Explain the concept of series capacitive compensation   [6M]
   b) Discuss basic operating control scheme for GCSC   [6M]

8. a) Briefly explain about voltage and phase angle regulation   [6M]
   b) Briefly explain improvement of transient stability by phase angle regulators   [6M]

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AR16

Time: 3 Hours   Max Marks:60

Answer any FIVE questions
All questions carry EQUAL marks

1.	(a)	Explain about the scaling limitation for low voltage, low power design. Give the effect of scaling on various MOSFET parameters with necessary equations.	6M
	(b)	Explain about the various drain structures used in BICMOS process integration	6M
2.	(a)	How isolation in Bi CMOS structures is carried out? Explain	6M
	(b)	Explain about the shallow trench isolation technique.	6M
3.	(a)	What are the considerations for Integrated Analog / Digital Bi CMOS process? Explain	6M
	(b)	Explain about HICUM Bipolar model and its advanced model in detail	6M
4.	(a)	Explain the limitations of MOSFET models	6M
	(b)	Draw the CMOS implementation of 2 input XOR gate with a stick diagram	6M
5.		Explain Analytical and Experimental characterization of sub-half micron MOS devices	12M
6.	(a)	What is the need for low power latches and flip flops.& explain the uses of latches and flip flops.	6M
	(b)	Explain the setup time and hold time consideration in flip flops?	6M
7.	(a)	Explain performance evaluation between Conventional CMOS and Bi CMOS logic gates?	6M
	(b)	Explain the operation of Advanced Bi CMOS Digital circuits	6M
8.		Write a short note on	
	(a)	Silicon-on-Insulator technology	4M
	(b)	Low Power Latches	4M
	(c)	Quality measures for Flip-Flops	4M

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Code No: 16MCS1012
ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I M.Tech. II Semester Regular & Supplementary Examinations, August-2018

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) Define Modelling and its types. Discuss about the Importance and Principles of Modelling. [6M]
   b) What is meant by Unified Modelling Language (UML)? Explain about the UML Architecture. [6M]

2. What is a Class? Elaborate about the components of Class diagram and create a class diagram for "**School Management System".** [12M]

3. What is an Interaction diagram? Explain about Sequence and Collaboration diagram with all its notations and Draw on sequence diagram for **Fund Transfer procedure** in **Online Banking System**. [12M]

4. a) Discuss in detail about UML Usecase Diagram with **Library Application** as an Example. [6M]
   b) Describe about the State Chart Diagram with an example. [6M]

5. Discuss about all the Symbols of Activity Diagram with **ATM Application**. [12M]

6. Draw the Class diagram for **Online Shopping System** by considering the following classes 1. Customer, 2. Order, 3. Order_Details, 4. Payment, 5. Debit card, 6. Net banking, 7. Credit card, 8. Cash_On_Delivery, 9. OSS_Admin, 10. OSS_DB. [12M]

7. What is meant by Implementation diagram? Discuss about compound and Deployment diagrams with examples. [12M]

8. Build a Usecase and Class diagram for **"Online Bus Reservation System".**Hint: Similar to 'www.redbus.in' service. [12M]

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Code No: 16MSE1013   **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I M.Tech. II Semester Regular & Supplementary Examinations, August-2018
STABILITY OF STRUCTURES
(Structural Engineering)

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

Answer any FIVE questions
All questions carry equal marks

1.		Derive the equation for Beam column with continuous lateral loads and how couples are taken into account of beam column derivation	(12M)
2.		Explain the elastic buckling of straight columns with non-sway mode	(12M)
3.		Determine the effect of shear force on critical load in built up columns with different support conditions	(12M)
4.	(a)	Explain buckling of bar with intermediate compressive forces	(6M)
	(b)	Explain buckling of bar with intermediate distributed axial loads	(6M)
5.	(a)	Explain effect of shear force on critical load	(6M)
	(b)	Explain the effect of initial curvature on bars	(6M)
6.	(a)	Write about critical stress diagram and empirical formulae of design	(6M)
	(b)	Explain various load condition and end condition of columns	(6M)
7.		What is Ritz method? Explain Galerkin method by taking stability of condition into account	(12M)
8.		Determine buckling of I-cross section subjected to pure bending	(12M)