

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

**I M.Tech. II Semester Regular & Supplementary Examinations, June-2019
COMPUTATIONAL FLUID DYNAMICS**

(Thermal Engineering)

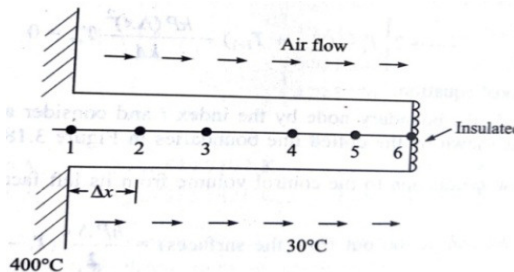
Time: 3 Hours

Max Marks:60

**Answer any FIVE questions
All questions carry EQUAL marks**

1. (a) Discuss the difference between Finite difference and finite volume methods. 6M
(b) Describe the criterion when a given differential equation is classified as hyperbolic, parabolic or elliptical 6M
2. (a) Solve the following algebraic equations using Gauss elimination method

$$\begin{aligned} x + 4y - z &= -5 \\ x + y - 6z &= -12 \\ 3x - y - z &= 4 \end{aligned}$$
 6M
(b) Distinguish between discretization error and round off errors. Compare them with suitable examples. 6M
3. (a) Using Taylor series, define the first forward difference and backward difference expression for $\frac{\partial u}{\partial x}$ 6M
(b) Explain back ward, forward and central difference methods. 6M
4. An aluminium rod ($k = 200 \text{ W/m K}$) of 20 mm diameter and 0.2 m long protrudes from a wall which is maintained at 400°C as shown in Fig . The end of the rod is insulated and the surface of the rod is exposed to air at 30°C . The air is flowing around the rod gives a convective heat transfer coefficient of $40 \text{ W/m}^2 \text{K}$. With the help of numerical method determine (a) calculate the temperature at six nodes as shown in figure (b) determine the rate of heat loss from the base through the fin.



5. Explain the method of solving $\frac{\partial T}{\partial t} = \alpha \frac{\partial^2 T}{\partial x^2}$ using explicit method and discuss its stability using Von-Neumann stability analysis. 12M
6. Define Vorticity ? How the pressure gradient term eliminated from momentum equations using Vorticity - Stream functions method? what are the advantages and disadvantages of this method in determination of flow field. 12M
7. (a) What are the four basic rules for discretization using finite volume method. 6M
(b) Explain upwind discretization applied to finite volume method. 6M
8. (a) Explain relative merits and demerits of explicit and implicit schemes 5M
(b) Solve the given system by using Thomas algorithm

$$\begin{bmatrix} -1 & 1 & 0 & 0 \\ 1 & -2 & 1 & 0 \\ 0 & 1 & -2 & 1 \\ 0 & 0 & 1 & -2 \end{bmatrix} \begin{bmatrix} T_0 \\ T_1 \\ T_2 \\ T_3 \end{bmatrix} = \begin{bmatrix} -40 \\ -30 \\ -30 \\ -30 \end{bmatrix}$$

7M

AR16

CODE: 16MPE1012

SET-1

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
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I M.Tech. II Semester Regular & Supplementary Examinations, June-2019

ADVANCED DIGITAL SIGNAL PROCESSING AND ITS APPLICATIONS
(PED)

Time: 3 Hours

Max Marks:60

Answer any FIVE questions
All questions carry EQUAL marks

1. An 8 point sequence is given by $x(n)=\{1,3,4,4,3,2,1,1\}$ Compute 8 point DFT of $x(n)$ and sketch magnitude and phase response 12M
2. Realize the second order digital filter 12M
$$Y(n) = 2r \cos(W_0)y(n-1) - r^2y(n-2) + x(n) - r \cos(w_0) x(n-1)$$
3. Design a low pass Butterworth digital IIR filter to give response of 3dB or less for frequencies up to 2KHz and attenuation of 20 dB or more beyond 4KHz. Obtain $H(z)$ by using bilinear transformation. 12M
4. (a) Explain the errors due to quantization. 8M
(b) Realize the following system with minimum number of multipliers. 4M
$$H(z) = \frac{1}{4} + \frac{1}{2}z^{-1} + \frac{3}{4}z^{-2} + \frac{1}{2}z^{-3} + \frac{1}{4}z^{-4}$$
5. (a) Compare FIR and IIR filters. 6M
(b) Discuss about spectral Transformations of IIR filter. 6M
6. (a) How can you design a digital filter from analog filter? 6M
(b) Illustrate the design of computationally efficient FIR digital filters 6M
7. Explain the functional block diagram of the TMS320LF2407A DSP controller with neat diagram. 12M
8. (a) Explain how the PWM waveforms are generated with compare units. 6M
(b) Explain about General Purpose Timers. 6M

AR16

CODE: 16MCS1013

SET-1

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

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

WEB TECHNOLOGIES (Computer Science and Engineering)

Time: 3 Hours

Max Marks: 60

**Answer any FIVE questions
All questions carry EQUAL marks**

1. (a) Differentiate types of list with suitable example. [6 M]

(b) Illustrate descendant, child and id selectors with suitable examples. [6 M]
2. Demonstrate different attributes for table, tr, td tags for student exam results portal [12 M]
3. Explain XML Schema for ship order. [12 M]
4. (a) How to implement session tracking using cookies in servlet. [6M]

(b) Explain the life cycle of servlet in detail. [6M]
5. (a) Explain the anatomy of JSP page [6 M]

(b) Compare and contrast JSP over Servlet. [6 M]
6. Write JSP code to store and retrieve the book details from library using JDBC. [12M]
7. Explain how different properties are created by using JavaBean API? [12M]
8. (a) Illustrate the spring framework. [6M]

(b) List the advantages of springs. [6M]

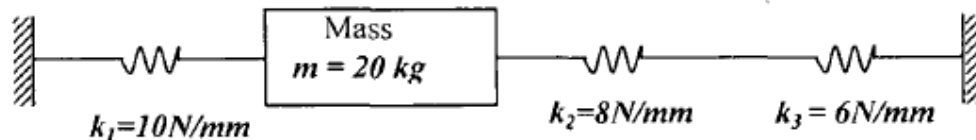
**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)****I M.Tech. II Semester Regular & Supplementary Examinations, June-2019****STRUCTURAL DYNAMICS AND EARTHQUAKE RESISTANT DESIGN
(Structural Engineering)**

Time: 3 Hours

Max Marks:60

Answer any FIVE questions
All questions carry EQUAL marks

1. (a) Classify the Earthquakes. Explain briefly about seismic zones of India. 6M
(b) What are the different types of seismic waves will get generated while earthquake? 6M
Explain them briefly.
2. (a) Write short notes on 4M
(i) Damping ratio
(ii) Normal fault
(iii) Reverse fault
(iv) Natural frequency
(b) What do you understand about Damping? Explain about under, critical and over damping. 8M
3. (a) Derive the equation of motion for single degree of freedom of damped free vibration. 6M
(b) Write down the equilibrium equation of the system shown in **Fig. 1**. Find out the natural frequency of vibration of the system. 6M

**Fig. 1**

4. A mass of 2 kg is suspended by a spring having a stiffness at 800 N/m. The mass is displaced downward from its equilibrium position by a distance of 0.03 m. Estimate equation of motion, normal frequency, the response of the system and total energy. 12M

5. (a) What do you understand about Logarithmic Decrement? 6M
 (b) Derive expression for equation of motion of free vibration of undamped Single degree of freedom system using D' Alembert principle. 6M
6. Calculate the natural frequency and mode shape for the MDOF system shown in Fig. 2. $EI = 4.5 \times 10^6 \text{ N-m}^2$ for all columns. 12M

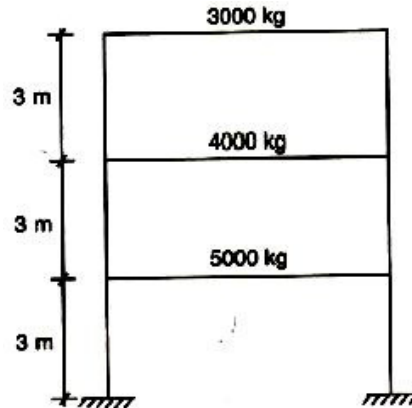
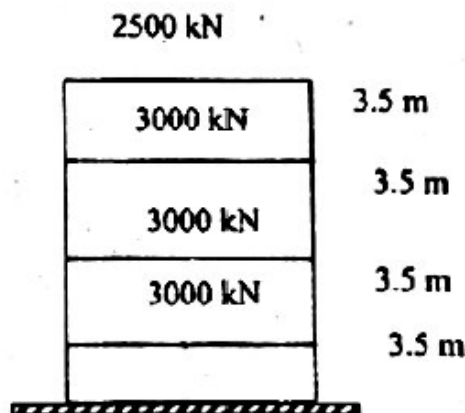


Fig. 2.

7. A four storey RC frame building as shown in figure is situated at Visakhapatnam. The height between the floors is 3.5 m and total height of a building is 14 m. The dead load and normal live load is lumped at respective floor. The soil below the foundation is assumed to be hard rock. Assume building is intended to be used as a hospital. Determine the total base shear **distributed lateral** force as per IS 1893. 12M



8. Draw the connection detailing of reinforcement at the beam column joint of concrete structure as per IS 13920. Explain the importance of closely spaced stirrups and ties in around the joint region. 12M