AR19

CODE: 19MTE1008 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I M.Tech II Semester Regular Examinations, December-2020

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.	6
	b)	Classify the given second order equation: $3\left(\frac{\partial^2\phi}{\partial x^2}\right)+2\left(\frac{\partial^2\phi}{\partial x \partial y}\right)+\left(\frac{\partial^2\phi}{\partial y^2}\right)=0$	6
2.	a)	Solve following equations using Gauss elimination method. x + 4y - z = -5 x + y - 6z = -12 3x - y - z = 4	8
	b)	What are the four basic rules for discretization using FVM?	4
3.		For the function $f(x) = 2x^3 - 6x$, compute $\partial f/\partial x$ and $\partial^2 f/\partial x^2$ at x = 1 by forward differencing of first order; and central differencing of second order approximations. Use step sizes of 0.1.	12
4.		Consider one-dimensional steady state heat conduction is governed by $\frac{d}{dx}\left(k\frac{dT}{dx}\right)=0$ through a slab of length 0.5 m. The left end and right end of the slab are maintained at 100°C and 50°C respectively. Given k = 2 W/m K and length of one small element is 0.1 m. Use FVM and obtain the set of algebraic equations at nodal points.	12
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.	12
6.		What is the main advantage of vorticity-stream function formulation over conventional way of solving Navier-Stokes equations? Explain.	12
7.	a)	List out variants of the implicit pressure correction methods for incompressible Navier-Stokes equation.	6
	b)	Write SIMPLER algorithm for solving the pressure and velocity terms? Enumerate the steps.	6
8.	a)	What is meant by staggered grid? What are its advantages over conventional grids?	6
	b)	Briefly describe RANS turbulence modeling.	6

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CODE: 19MPE1010 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I M.Tech. II Semester Regular Examinations, December, 2020

SWITCHED MODE POWER CONVERTERS
(PED)

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

Answer any FIVE questions
All questions carry EQUAL marks

1.	a)	Explain in detail the transformer isolation in switched mode power converters.	5M
	b)	Discuss about power circuit of push-pull converter.	7M
2.	a)	Discuss about power circuit and steady state analysis of flyback converter.	12M
3.	a)	Discuss about power circuit of full bridge isolated converter.	6M
	b)	Explain the utilization of magnetic circuit in half bridge isolated converter.	6M
4.	a)	Derive the average model for boost converter.	6M
	b)	Derive the transfer function for buck converter by using small signal model.	6M
5.	a)	Explain the importance of Bode plot in frequency domain analysis.	5M
	b)	Discuss the functioning of proportional plus Integral (PI) controller with necessary diagrams.	7M
6.	a)	Explain in detail about Series resonant converter circuit with complete analysis.	12M
7.	a)	Explain zero voltage switching in resonant converters.	6M
	b)	Explain the operation of M-type zero voltage switching buck converter.	6M
8.	a)	Explain the operation of M-type zero current switching buck converter.	6M
	b)	Explain the operation of L-type zero current switching boost converter.	6M

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CODE: 19MVL1010 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I M.Tech II Semester Regular Examinations, December-2020

DESIGN OF FAULT TOLERANT SYSTEMS
(VLSI System Design)

Time: 3 Hours Max Marks: 60

Answer any FIVE questions
All questions carry EQUAL marks

1.	a)	Explain reliability of series and parallel systems with neat diagrams.	6M
	b)	Derive the relationship between Reliability and failure rate	6M
2.	a)	Explain the operation of TMR system.	6M
	b)	Write notes on SMR configuration and discuss its merits and demerits	6M
3.	a)	Evaluate the series and parallel systems in combinational circuits.	6M
	b)	Explain about LSSD	6M
4.	a)	Explain the design approach of totally self checking checker using m out of n code	6M
	b)	Discuss the totally self checking PLA design	6M
5.	a)	Explain totally self-checking checker for low-cost residue code?	6M
	b)	Design a totally self checking checker using Berger code?	6M
6.	a)	Explain Reed Muller's expansion technique for testable combinational circuits?	6M
	b)	Differentiate between Controllability and Observability with example?	6M
7.		Explain the theory and operation of linear feedback shift register.	12M
8.	a)	Evaluate the concept of BIST and Classify test pattern generation for BIST?	6M
	b)	Explain the operation of LFSR as signature analyzer?	6M

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CODE: 19MCS1010 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I M.Tech II Semester Regular Examinations, December-2020

OBJECT ORIENTED SOFTWARE ENGINEERING
Computer Science and Engineering

Time: 3 Hours Max Marks: 60

Answer any FIVE questions
All questions carry EQUAL marks

1.	a)	Differentiate structured paradigm and the object oriented paradigm	6M
	b)	Explain the following with suitable Examples: Composition, Aggregation, generalization, Association	6M
2.	a)	What is Domain analysis document? Explain in detail about each section present in that document along with an example.	6M
	b)	Define Use Case? Explain briefly about developing use case models of systems with an example?	6M
3.	a)	Discuss about Structured Analysis vs Object Oriented Analysis	6M
	b)	What is analysis model? List the objects of analysis model? How do you identify these objects?	6M
4.	a)	Explain the design technique for achieving high cohesion among modules with an example.	6M
	b)	Discuss the generic components of object oriented design model.	6M
5.	a)	Explain the different approaches for identifying the classes. Describe the CRC cards approach	6M
	b)	Draw the usecase and sequence diagram of elevator system.	6M
6.	a)	Explain in detail about module test case selection.	6M
	b)	Explain the intent of object oriented metrics. Describe the potential problems when testing objects.	6M
7.	a)	Describe the challenges of design phase.	6M
	b)	Explain in detail about the metrics to describe the aspects of design.	6M
8.	a)	Describe briefly about creational pattern and behavioral patterns.	6M
	b)	List out the benefits and dangers of design patterns.	6M

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CODE: 19MSE1006 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

I M.Tech II Semester Regular Examinations, December-2020

STRUCTURAL DYNAMICS

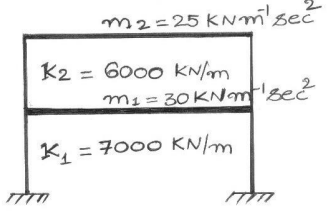
Structural Engineering

Time: 3 Hours Max Marks: 60

Answer any FIVE questions

All questions carry EQUAL marks

1.	a)	Classify the vibrations in structural system. Explain with neat sketches.	**6M**
	b)	Explain clearly the rectilinear or longitudinal vibration, lateral or transverse vibrations and torsional vibrations.	**6M**
2.	a)	Explain Simple Harmonic motion with vectorial representation. Also explain the examples of SHM.	**6M**
	b)	Find the amplitude of the sum of the two harmonic motions, $x_1 = 3\cos(2t + 1^o)$; $x_2 = 4\cos(2t + 1.5^o)$;	**6M**
3.	a)	Forced response of structural system without damping subjected to harmonic loading.	**8M**
	b)	State dynamic effects of earthquake loading.	**4M**
4.	a)	Explain types of damping and logarithmic decrement	**6M**
	b)	Formulate damped single degree of freedom system subjected to base excitation.	**6M**
5.		Find the natural frequencies and mode shapes for the shear building shown in figure	**12M**



6.	a)	Explain the mode superposition methods to combine the modes in response spectra method of analysis.	**6M**
	b)	Explain the orthogonality condition of modes for multi degree freedom system.	**6M**
7.		Deduce an expression for the response of a single degree of freedom free vibration system with viscous damping	**12M**
8.	a)	State D'Alembert's principles and its application in formulating equation of motion in structural dynamics	**6M**
	b)	Determine the natural frequency of the system given in figure. Where W=20kg; beam length 30cm; spring stiffness, k=20kg/cm; E=2x106kg/cm^2 and I=0.0432cm^4	**6M**