AR19

CODE: 19MTE1008 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)

I M.Tech. II Semester Regular & Supplementary Examinations, January-2022

COMPUTATIONAL FLUID DYNAMICS

Thermal Engineering

Time: 3 Hours Max Marks: 60

Answer any FIVE questions
All questions carry EQUAL marks

1.	a)	Discuss about the steps involved in finite difference solution process.	6
	b)	Show that one-dimensional heat conduction equation, given by: $\frac{\partial T}{\partial t} = \alpha \frac{\partial^2 T}{\partial x^2}$, is an elliptic equation.	6
2.	a)	Write short notes on i) Truncation error ii) stability iii) convergence	6
	b)	Solve the following algebraic equation using Gauss elimination method. $x_2 + x_3 = 2$ $2x_1 + 3x_3 = 5$ $x_1 + x_2 + x_3 = 3$	6
3.	a)	Explain different types of boundary conditions that are frequently encountered in fluid flow problems.	6
	b)	Solve the backward difference approximation of O(Δx) for $\frac{\partial f}{\partial x}$.	6
4.		A rod of length 0.4 m is maintained at temperature 200^0C and 500^0C at its two ends. The rod is insulated along its lateral surface. The cross sectional area of the rod is $5x10^{-3}$ m^2 and its thermal conductivity is 750 W/m-K. Express the resultant simultaneous equations in the matrix form (Use finite difference method)	12
5.		Consider one-dimensional steady state heat conduction with heat generation is governed by $\frac{d}{dx}\left(k\frac{dT}{dx}\right) + q = 0$ 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. The heat generation is given by q = 1000-T. 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
6.		What is Vorticity? How the pressure gradient term can be eliminated in momentum equations using Vorticity-Stream functions method? Further, enumerate the advantages and disadvantages of this method in determination of the flow field.	12
7		List out variants of the implicit pressure correction methods for incompressible Navier-Stokes equation. Discuss SIMPLE algorithm.	12
8.	a)	Explain relative merits and demerits of explicit and implicit schemes	6
	b)	Briefly describe DNS of turbulence modeling.	6

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CODE: 19MPE1010 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I M.Tech. II Semester Regular & Supplementary Examinations, January-2022

SWITCHED MODE POWER CONVERTERS
(PED)

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

Answer any FIVE questions
All questions carry EQUAL marks

1.	a)	Discuss about power circuit of forward converter.	6M
	b)	Discuss about power circuit of flyback converter.	6M
2.	a)	Explain the utilization of magnetic circuit in push-pull converter.	5M
	b)	Derive expressions for steady state analysis of push-pull converter.	7M
3.		Explain in detail about the power circuit and steady state analysis of half bridge isolated converter.	12M
4.	a)	Derive the small signal linearised model for buck converter.	6M
	b)	Derive the transfer function for boost converter by using small signal model.	6M
5.	a)	Explain the relationship between phase margin and gain margin in concept of stability.	4M
	b)	Discuss the functioning of proportional plus Integral plus Deriatie (PID) controller with necessary diagrams.	8M
6.		Explain in detail about parallel resonant converter circuit with complete analysis.	12M
7.	a)	Explain zero current switching in resonant converters.	6M
	b)	Explain the operation of L-type zero current switching buck converter.	6M
8.	a)	Explain the operation of M-type zero current switching boost converter.	6M
	b)	Explain the operation of L-type zero voltage switching boost converter.	6M

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CODE: 19MCS1010 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)

I M.Tech. II Semester Regular & Supplementary Examinations, January-2022

OBJECT ORIENTED SOFTWARE ENGINEERING
Computer Science Engineering

Time: 3 Hours Max Marks: 60

Answer any FIVE questions
All questions carry EQUAL marks

1.	a)	Describe in detail about object-oriented life cycle models.	6M
	b)	Explain the methods of identifying objects for a problem statement.	6M
2.	a)	List and explain the different modeling's carried out under object oriented analysis with suitable examples.	6M
	b)	Describe the challenges of the object oriented analysis phase.	6M
3.	a)	Explain the techniques in Domain Analysis	6M
	b)	List out the Goals and elements of Analysis Modelling? Brief about them	6M
4.	a)	Explain various characteristics of requirements.	6M
	b)	What are the essentials of UML Class diagram? Explain with examples.	6M
5.	a)	Discuss the principle object design concepts.	6M
	b)	Explain the need of formal techniques in detailed design phase.	6M
6.	a)	Define coupling & cohesion. Explain different types of coupling and cohesion	6M
	b)	Explain the strategies for testing large systems? Explain the object oriented testing strategies	6M
7.	a)	Explain the metrics for object oriented projects.	6M
	b)	List and explain the distinguished characteristics of the metrics for object oriented systems.	6M
8.	a)	Explain briefly about (a) Observer Pattern (b)Façade Pattern (c) Proxy Pattern	6M
	b)	Explain briefly about software architecture including component and deployment diagrams?	6M

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CODE: 19MVL1010 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)

I M.Tech. II Semester Regular & Supplementary Examinations, January-2022

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)	Derive the relationship between Maintainability and Availability	6M
	b)	Derive the reliability of parallel and series combinational circuits	6M
2.	a)	Explain about failures and faults	6M
	b)	Evaluate the series and parallel systems in combinational circuits	6M
3.	a)	Explain the use of error correcting codes?	6M
	b)	With a neat diagram explain the principle of operation of Sift out Modular Redundancy (SMR). Give its merits and demerits?	6M
4.	a)	Derive the expression of Reed Muller expansion	6M
	b)	Describe in detail Testability, controllability and observability.	6M
5.	a)	Explain the scan shift register in detail.	6M
	b)	Briefly explain the multiple clock and scan domain operation	6M
6.	a)	Outline the Static, dynamic, hybrid redundancy techniques with suitable example?	6M
	b)	Explain the basic concepts of fault tolerant design	6M
7.	a)	Discuss about Scan Path Techniques?	6M
	b)	Explain about fail-safe design of sequential circuits using Berger code?	6M
8.	a)	Explain about pseudo exhaustive testing.	6M
	b)	Write a short notes on BIST Concept.	6M

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CODE: 19MSE1006 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

I M.Tech. II Semester Regular & Supplementary Examinations, January-2022

STRUCTURAL DYNAMICS

(Structural Engineering)

Time: 3 Hours Max Marks: 60

Answer any FIVE questions

All questions carry EQUAL marks

1.	a)	Define the following terms: undamped, damped, free and forced vibrations; resonance; phase difference; periodic motion; time period; amplitude and degrees of freedom	**6M**
	b)	Define the degrees of freedom and explain the types with example	**6M**
2.		Determine the effective stiffness for a portal frame.	**12M**
3.		Determine the differential equation of a classical spring-mass system and its natural frequency by using (i) D'Alembert's principle, (ii) energy method and (iii) Rayleigh's method.	**12M**
4.		A machine of 500 kg mass is acting upon with an external force 2000N at a frequency of 1500 rev/min. Two reduce the effective of vibration an isolator of rubber having a static deflection of 2mm under the machine load and an estimated damping factor € = 0.2 are used. Determine i) the force transmitted to the foundation ii) the amplitude of vibration.	**12M**
5.		Calculate the natural frequency and mode shape for the MDOF system is EI=4.5 x 10^6 N mm^2 for all columns	**12M**
6.		single degree of freedom structure for which the weight W= 667.5 kN set into vibration by releasing it from an initial displacement of 50 mm. Given that its maximum displacement after one complete oscillation is 30 mm and that it will occurs in 0.85 s, evaluate the following quantities on the assumption that damping is of the viscous type. a) The logarithmic decrement of the system, δ, and the associated damping factor, ξ. b) The damped natural period of vibration T_d. c) The undamped natural period, d) The stiffness, K and The coefficient of viscous damping, c	**12M**
7.		Derive the response of a SDOF system due to base excitation.	**12M**
8.		Explain the IS code procedure for response of multi storey building using Response spectra method.	**12M**