



**LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
(AUTONOMOUS)**

L.B. Reddy Nagar :: Mylavaram-521 230 :: NTR Dist. :: A.P
Approved by AICTE, New Delhi. Affiliated to JNTUK, Kakinada

M.Tech. (I Semester) (R25) Semester End Examinations (Regular) – March 2026

TIME TABLE

R25

Time : 10.00 AM to 01.00 PM

A.Y. : 2025-26

Specialization	09-03-2026 (Monday)	11-03-2026 (Wednesday)	13-03-2026 (Friday)	16-03-2026 (Monday)	18-03-2026 (Wednesday)
				Program Elective-I	Program Elective-II
Data Science	D2518801 - Advanced Algorithms Analysis	D2518802 - Data Science and its Applications	D2518803 - Artificial Intelligence	D25188A0 - Agile Methodologies	D25188B0 - Full Stack Technologies
Power Electronics and Electrical Drives	D251AN01 - Electrical Machine Modeling and Analysis	D251AN02- Power Electronic Converters	D251AN03 - Electric Vehicles	D251ANA1 - Power Quality Enhancement using Custom Power Devices	D251ANB0 - Renewable Energy Technologies
VLSI and Embedded Systems Design	D251AP01 - Advanced Digital Systems Design	D251AP02 - Embedded Hardware Platforms and Programming	D251AP03 - FPGA Design	D251APA3 - VLSI Testing & Testability	D251APB3 - Cryptography and Network Security
Thermal Power Engineering	D251AQ01 -Advanced Thermodynamics	D251AQ02 - Advanced Fluid Mechanics	D251AQ03 - Advanced Heat and Mass Transfer	D251AQA0 - Power Plant Management	D251AQB0 - Solar Energy

Note: Any omissions or clashes in the time table may please be informed to the Controller of Examinations immediately.

Date: 21-02-2026

CONTROLLER OF EXAMINATIONS

PRINCIPAL

Copy to: 1. Vice-Principal, Deans & HoDs
3. Canteen, PD, Security & Hostels

2. T&P cell, Transport co-ordinator & Librarian
4. Coordinator-Disciplinary 5. Notice Boards

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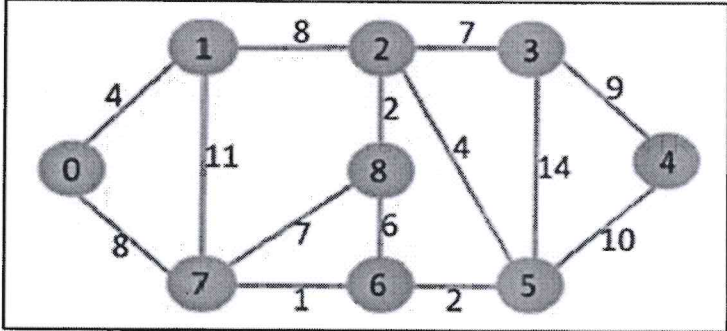
LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING(AUTONOMOUS)
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M.Tech. (I Semester) Regular Examinations

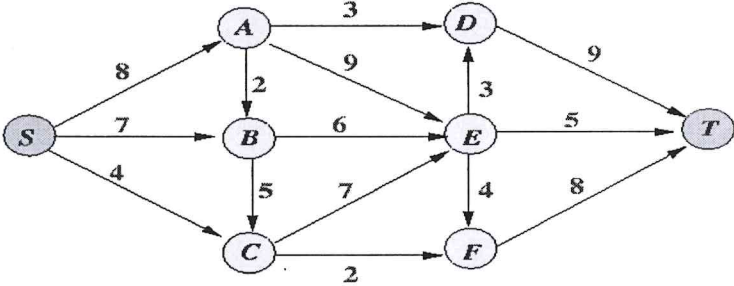
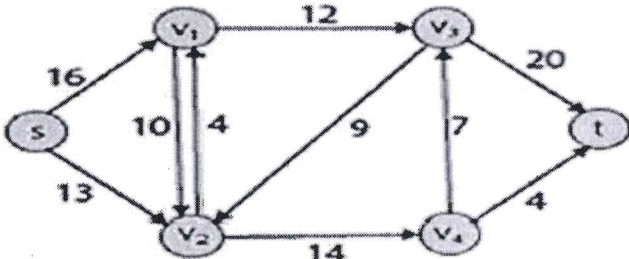
D2518801-ADVANCED ALGORITHMS ANALYSIS
 (DS)

Time : 3 hours

Max. Marks : 60

Q.No	All questions carry equal marks	Marks	CO	BL
1(a)	Trace the Quick Sort algorithm step-by-step for the following input array: $A = [25,10,30,15,20,28]$ and analyze its Time Complexity.	6M	CO1	L3
(b)	Find the Shortest Path for the following graph using Dijkstra's Algorithm. 	6M	CO2	L3
(OR)				
2(a)	Analyze and justify the performance of Merge Sort by tracing its execution on a sample input. Derive its time and space complexity and evaluate its stability.	6M	CO1	L3
(b)	Analyze the Depth-First Search (DFS) algorithm and explain how it is used to compute Strongly Connected Components (SCCs) in a directed graph. Analyze the correctness and time complexity of the algorithm.	6M	CO2	L3
3.	Consider an undirected graph $G = (V, E)$ where each vertex $v \in V$ is assigned a positive weight $w(v)$. (i) Define the concept of a maximal independent set and explain how it differs from a maximum weight independent set. (ii) Design an algorithm to compute a maximum weight maximal independent set of the graph. Clearly describe the steps of the algorithm using either pseudocode or a structured approach. (iii) Apply your algorithm on the following graph and show all intermediate steps: Vertices: $V = \{A, B, C, D, E\}$ Edges: $E = \{(A, B), (A, C), (B, D), (C, D), (D, E)\}$ Weights: $w(A) = 5, w(B) = 3, w(C) = 6, w(D) = 4, w(E) = 2$	12M	CO2	L4
(OR)				
4(a)	Define a Minimum Spanning Tree (MST). Analyze how MST is used in network design and clustering, and justify its effectiveness compared to other approaches.	6M	CO2	L3
(b)	Write Control Abstraction of Greedy method.	6M	CO2	L2

D2518801-ADVANCED ALGORITHMS ANALYSIS

5.	<p>Apply the Max-Flow Min-Cut Theorem to a given flow network to compute the maximum flow and identify the corresponding minimum cut. Verify that the value of the maximum flow is equal to the capacity of the minimum cut.</p> 	12M	CO2	L3
(OR)				
6(a)	<p>Apply the Divide and Conquer control abstraction to design an algorithm for binary search. Clearly identify the divide, conquer, and combine steps and explain their role in the algorithm.</p>	6M	CO2	L3
(b)	<p>Apply the Ford-Fulkerson method (augmenting-path approach) to find the maximum flow from s to t.</p> 	6M	CO3	L3
7(a)	<p>Write the algorithm to compute 0/1 Knapsack problem using dynamic programming and explain it.</p>	6M	CO4	L3
(b)	<p>Compute the Fast Fourier Transform (FFT) of the sequence $x(n) = \{1,2,3,4\}$ using the radix-2 FFT algorithm.</p>	6M	CO4	L3
(OR)				
8(a)	<p>Analyze how the Schonhage-Strassen algorithm leverages the Fast Fourier Transform to transform large integer multiplication into convolution, and explain how this approach reduces computational complexity compared to classical methods.</p>	6M	CO4	L4
(b)	<p>Write the algorithm/pseudocode to compute the DFT of a sequence of length N.</p>	6M	CO4	L3
9(a)	<p>Illustrate the geometry of the feasible region for a two-variable linear programming problem and explain how optimality is achieved using corner-point analysis.</p>	6M	CO5	L3
(b)	<p>Define NP-hard and NP-complete problems. Explain the relationship between P, NP, NP-hard, and NP-complete classes.</p>	6M	CO5	L3
(OR)				
10(a)	<p>Explain how modern searching techniques (e.g., hashing, advanced tree structures) improve efficiency in large-scale problems.</p>	6M	CO5	L3
(b)	<p>Differentiate between decision and optimization versions of NP-complete problems with suitable examples.</p>	6M	CO5	L2

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M.Tech. (I Semester) Regular Examinations

D251AN01-ELECTRICAL MACHINES MODELING AND ANALYSIS

(PE&ED)

Time : 3 hours

Max. Marks : 60

Q.No	All questions carry equal marks	Marks	CO	BL
1(a)	Obtain the transfer function of D.C. Motor $\frac{T(s)}{E_a(s)}$. Draw its block diagram.	6M	CO1	L3
(b)	Obtain the expression for torque developed in two-pole machine in terms of matrix $G(\theta)$, where $G(\theta)$ is the matrix containing rotational terms only.	6M	CO1	L4
(OR)				
2(a)	Explain the function of magnetic coupling field in an electromechanical energy conversion device.	6M	CO1	L2
(b)	Starting from fundamentals, obtain the state variable form of D.C. Series motor.	6M	CO1	L3
(OR)				
3(a)	Using Necessary transformation technique, obtain the (a,b,c) to (α, β, o) transformation and also the transformation matrix.	6M	CO2	L4
(b)	What is two-axis model? Obtain the expression for flux linkages by using the two-axis model of the induction machine.	6M	CO2	L4
(OR)				
4(a)	Obtain the dqo transform of balanced systems and inverse transform; also, calculate the instantaneous power in the dqo frame, and draw the necessary phasor diagrams.	6M	CO2	L3
(b)	Derive the transformations for currents between a rotating Z-plane (α, β) winding and a pseudo-stationary two-phase (d,q) winding. Assume equal turns on all coils so that the transform matrix is equal to inverse.	6M	CO2	L3
(OR)				
5(a)	Write the 3-ph induction machine voltage equations and obtain the state variable form and necessary matrices.	6M	CO3	L3
(b)	Determine the dynamic model of induction motor based on dqo transformation and instantaneous torque developed.	6M	CO2	L3
(OR)				
6(a)	Draw the arbitrary reference frame equivalent circuit of the induction machine and write the voltage equations in state variable form.	6M	CO3	L4
(b)	What are the assumptions made for the two-axis representation of 3-phase induction motor and derive the expression for self and mutual inductance of rotor.	6M	CO3	L3
(OR)				
7(a)	Derive an expression for air gap m.m.f in a 2-pole, 3-ph, Y-connected salient pole synchronous machine.	6M	CO2	L4
(b)	Describe the analysis of steady-state operation of synchronous machine during sudden changes in input torque.	6M	CO2	L2
(OR)				
8(a)	Explain the concepts of critical time and critical clearing angle in synchronous machine.	6M	CO2	L2
(b)	Determine the torque developed in a salient pole synchronous machine using the park's transformation and explain saliency torque, damping torque and excitation torque.	6M	CO2	L4
(OR)				
9(a)	Derive the torque equation of a BLDC motor.	6M	CO2	L3
(b)	Derive phase voltage equation, flux linkage relation, inductance variation with rotor position, and torque equation for switched reluctance motor.	6M	CO3	L4
(OR)				
10(a)	Discuss the nonlinear characteristics in SRM modeling.	6M	CO2	L2
(b)	Compare the modeling approaches of PMSM, BLDC, and SRM.	6M	CO3	L2

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M.Tech. (I Semester) Regular Examinations

D251AP01-ADVANCED DIGITAL SYSTEMS DESIGN

(VLSI&ESD)

Time : 3 hours

Max. Marks : 60

Q.No	All questions carry equal marks	Marks	CO	BL
1(a)	Compare PAL and PLA architectures with neat diagrams.	6M	CO1	L3
(b)	Demonstrate the configuration of slices in Xilinx Virtex architecture for logic realization.	6M	CO1	L3
(OR)				
2(a)	Illustrate how lookup tables (LUTs) are used to implement Boolean functions in FPGA.	6M	CO1	L3
(b)	Discuss the impact of programmable interconnects on FPGA performance.	6M	CO1	L2
(OR)				
3(a)	Illustrate the design of a serial data converter using sequential circuits.	6M	CO5	L3
(b)	Illustrate the conversion of serial data to parallel data using sequential circuits.	6M	CO5	L3
(OR)				
4(a)	Describe the procedure for analyzing sequential circuits using state tables.	6M	CO5	L2
(b)	Discuss the impact of clock signals on sequential circuit operation.	6M	CO5	L2
(OR)				
5(a)	Describe the structure and operation of iterative circuits.	6M	CO5	L2
(b)	Illustrate resource sharing in a sequential digital system.	6M	CO5	L3
(OR)				
6(a)	Apply FSM techniques to design a vending machine controller.	6M	CO5	L3
(b)	Describe the role of synchronizers in multi-clock systems.	6M	CO5	L2
(OR)				
7(a)	Explain the concept of fault modeling in digital circuits.	6M	CO2	L2
(b)	Demonstrate the fault diagnosis process using test algorithms.	6M	CO2	L3
(OR)				
8(a)	Explain the path sensitization technique used for fault detection.	6M	CO2	L2
(b)	Demonstrate the fault detection process using Kohavi algorithm.	6M	CO2	L3
(OR)				
9(a)	Demonstrate the circuit test approach for detecting faults in a sequential circuit.	6M	CO4	L3
(b)	Explain the procedure for detecting faults in sequential circuits.	6M	CO4	L2
(OR)				
10(a)	Design experiment to detect stuck-at fault in sequential circuit.	6M	CO4	L3
(b)	Explain the concept of machine identification in sequential circuits.	6M	CO4	L2

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M.Tech. (I Semester) Regular Examinations

D251AQ01-ADVANCED THERMODYNAMICS

(TPE)

Time : 3 hours

Max. Marks : 60

Q.No	All questions carry equal marks	Marks	CO	BL
1(a)	Describe various laws of thermodynamics.	6M	CO1	L2
(b)	A heat engine is used to drive a heat pump. The heat transfers from the heat engine and from the heat pump are used to heat the water circulating through the radiators of a building. The efficiency of the heat engine is 27 % and the COP of the heat pump is 4. Evaluate the ratio of the heat transfer to the circulating water to the heat transfer to the heat engine.	6M	CO1	L3
(OR)				
2(a)	Differentiate between first and second law of thermodynamics.	6M	CO1	L2
(b)	What is the Joule Thomson coefficient and prove that J-K effect is zero for an ideal gas?	6M	CO1	L3
(OR)				
3(a)	What is entropy? Discuss the characteristics of entropy.	6M	CO2	L2
(b)	Formulate the relations for entropy balance of closed systems.	6M	CO2	L3
(OR)				
4.	One kg of ice at -5°C is exposed to the atmosphere which is at 20°C . The ice melts and comes into thermal equilibrium with the atmosphere. Determine the entropy increase of the universe. C_p of ice is 2.093 kJ/kg K and the latent heat of fusion of ice is 333.3 kJ/kg .	12M	CO2	L4
(OR)				
5(a)	Deduce the general expression for irreversibility in non-flow process.	6M	CO3	L3
(b)	In a steam turbine the steam enters at 50 bar, 600°C and 150 m/s and leaves as saturated vapour at 0.1 bar, 50 m/s. During the expansion, work of 1000 kJ/kg is delivered. Determine the Irreversibility. Take dead state temperature as 15°C .	6M	CO3	L3
(OR)				
6(a)	Discuss the availability of closed system.	6M	CO3	L2
(b)	Air expands in a turbine adiabatically from 500 kPa, 400 K and 150 m/s to 100 kPa, 300 K and 70 m/s. The environment is at 100 kPa, 17°C . Calculate per kg of air (i) maximum work output (ii) The actual work output. (iii) The irreversibility.	6M	CO3	L3
(OR)				
7(a)	Explain the enthalpy of formation.	6M	CO4	L2
(b)	Determine the air-fuel ratio on both a molar and mass basis for the complete combustion of octane C_8H_{18} with the theoretical amount of air.	6M	CO4	L3
(OR)				
8.	Compare the first and second law analysis of reacting systems.	12M	CO4	L4
(OR)				
9(a)	Discuss the Irreversibilities present in steam power plants.	6M	CO5	L2
(b)	An ideal Lenoir cycle operates with air as the working fluid. The following data are given: Initial pressure, $P_1 = 100\text{kPa}$, Initial temperature, $T_1 = 300\text{K}$, Heat added at constant volume, $Q_{in} = 600\text{kJ/kg}$, Specific heat at constant volume, $C_v = 0.718\text{kJ/kg}\cdot\text{K}$, Specific heat at constant pressure, $C_p = 1.005\text{kJ/kg}\cdot\text{K}$, Ratio of specific heats, $\gamma = 1.4$. Find (i) Maximum temperature in the cycle (ii) Thermal efficiency.	6M	CO5	L3
(OR)				
10(a)	Derive the efficiency of Atkinson cycle with assumptions.	6M	CO5	L3
(b)	Describe the working of cogeneration cycle.	6M	CO5	L2

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M.Tech. (I Semester) Regular Examinations

D2518802-DATA SCIENCE AND ITS APPLICATIONS

(DS)

Time : 3 hours

Max. Marks : 60

Q.No	All questions carry equal marks	Marks	CO	BL
1(a)	How to declare and call functions in python programs? Illustrate with an example script?	6M	CO1	L2
(b)	Explain List and Dictionary, Generator Comprehensions with examples.	6M	CO1	L2
(OR)				
2(a)	Compare module and a package in Python with an example.	6M	CO1	L2
(b)	Illustrate try and except block in Python. Provide an example of handling an exception.	6M	CO1	L2
(OR)				
3(a)	Illustrate how event handling works in Python GUI applications. How do you attach callback functions to events such as button clicks, mouse movements, or key presses?	6M	CO2	L2
(b)	Explain network scripting in Python. How Python's socket library can be used to create both client and server applications?	6M	CO2	L2
(OR)				
4(a)	Analyze the roles of databases and persistence and python integration as essential tools and techniques for advanced python applications.	6M	CO2	L4
(b)	Discuss various data structures available in Python. Analyze how appropriate data structure selection improves application efficiency.	6M	CO2	L4
(OR)				
5(a)	Explain the difference between an element-wise operation and a reduction operation in the context of arrays.	6M	CO2	L2
(b)	Explain essential functionality available in pandas for data manipulation.	6M	CO3	L2
(OR)				
6(a)	Analyze how multidimensional arrays and hierarchical indexing help in managing complex datasets. Provide suitable examples to support your explanation.	6M	CO3	L4
(b)	Explain indexing, alignment behavior, vectorized operations, and how Series differs from NumPy arrays.	6M	CO3	L2
(OR)				
7(a)	Explain the concept of data wrangling and its importance with an example.	6M	CO3	L2
(b)	Explain how pivot tables assist in summarizing grouped data.	6M	CO3	L2
(OR)				
8	Design a structured approach for string manipulation in large textual datasets. Analyze the potential risks of improper string handling in data preprocessing.	12M	CO3	L6
(OR)				
9(a)	Explain the challenges of visualizing economic data in detail.	6M	CO4	L2
(b)	Explain customization techniques in Pandas plots and describe how labels, colors, styles, figure sizes, and axes modifications are applied.	6M	CO4	L3
(OR)				
10(a)	Compare different methods of visualizing time series data.	6M	CO4	L2
(b)	Explain the concept of resampling and frequency conversion in time series analysis.	6M	CO4	L2

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M.Tech. (I Semester) Regular Examinations

D251AN02-POWER ELECTRONIC CONVERTERS

(PE&ED)

Time : 3 hours

Max. Marks : 60

Q.No	All questions carry equal marks	Marks	CO	BL
1(a)	Illustrate the gate drive requirements of a Power MOSFET.	6M	CO1	L3
(b)	Explain the turn-on and turn-off process of an IGBT.	6M	CO1	L2
(OR)				
2(a)	Analyze the static and dynamic characteristics of a Gate Turn-Off Thyristor. Explain its advantages and limitations.	6M	CO1	L4
(b)	Illustrate the construction, operation, and switching characteristics of an IGBT. Compare it with MOSFET.	6M	CO1	L3
3.	Illustrate the operation of a three-phase fully controlled converter feeding an RL load under continuous current condition.	12M	CO1	L3
(OR)				
4(a)	Justify how the input power factor for a single-phase fully controlled converter is evaluated.	6M	CO2	L5
(b)	Describe the PWM control technique in single-phase AC-DC converters.	6M	CO2	L2
5(a)	Deconstruct the working mechanism of a three-phase Current Source Inverter and examine the relationship between switching pattern and output waveforms.	6M	CO3	L4
(b)	Discuss the basic principle of Space Vector Modulation (SVM).	6M	CO3	L2
(OR)				
6(a)	Draw and analyze the output voltage waveform of a single-phase full bridge inverter using Bipolar PWM.	6M	CO3	L4
(b)	Compare Voltage Source Inverter (VSI) and Current Source Inverter (CSI).	6M	CO3	L4
7(a)	Illustrate the construction and principle of operation of the Modular Multilevel Converter (MMC).	6M	CO1	L3
(b)	Evaluate the Improved Diode-Clamped Inverter and explain how it overcomes voltage balancing issues.	6M	CO1	L5
(OR)				
8.	Analyze the Improved Diode Clamped Multi-Level Inverter, and compare it with the conventional Diode Clamped Multi-Level Inverter.	12M	CO1	L4
9(a)	Justify how Selective Harmonic Elimination PWM is applied to the Diode Clamped Multilevel Inverter (DCMLI) with a switching pattern.	6M	CO3	L5
(b)	Interpret the principle of Phase Shifted Multicarrier PWM.	6M	CO3	L2
(OR)				
10(a)	Enumerate the problem of capacitor voltage balancing in DCMLI and explain various balancing methods.	6M	CO3	L2
(b)	Distinguish between the Phase Shifted PWM and the Level Shifted PWM.	6M	CO3	L4

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D251AP02-EMBEDDED HARDWARE PLATFORMS AND PROGRAMMING

(VLSI&ESD)

Time : 3 hours

Max. Marks : 60

Q.No	All questions carry equal marks	Marks	CO	BL
1(a)	Discuss common design metrics in embedded systems. Explain how these metrics influence system trade-offs.	6 M	CO1	L2
(b)	Explain the trade-offs between hardware and software implementation in embedded system design.	6 M	CO1	L2
(OR)				
2(a)	Explain processor technology used in embedded systems. Compare general-purpose processors, microcontrollers, DSPs, and SoCs.	6 M	CO1	L2
(b)	Explain the major design challenges in embedded system development. How do cost, performance, and power constraints affect system design?	6 M	CO1	L2
3(a)	Analyze the software development process for embedded applications including coding standards and debugging techniques.	6 M	CO1	L4
(b)	Discuss system testing in embedded systems. What are the challenges faced during testing?	6 M	CO3	L2
(OR)				
4(a)	Discuss the importance of requirements specification in embedded system design. What are functional and non-functional requirements?	6 M	CO1	L2
(b)	Illustrate the software development process for embedded applications including coding standards and debugging techniques.	6 M	CO2	L3
5(a)	Explain ARM processor architecture and its significance in embedded systems.	6 M	CO3	L2
(b)	Discuss bus-based computer systems and their architecture.	6 M	CO3	L2
(OR)				
6(a)	Discuss CPU performance metrics and benchmarking techniques for embedded processors.	6 M	CO3	L2
(b)	Explain system-level performance analysis methods in embedded system hardware.	6 M	CO3	L3
7(a)	Explain the assembly, linking, and loading process in embedded software development.	6 M	CO2	L2
(b)	Classify testing methods for embedded software.	6 M	CO3	L4
(OR)				
8(a)	Discuss the working of cross-compilation and its importance in embedded system development.	6 M	CO2	L2
(b)	Illustrate code optimization techniques for improving software performance in embedded systems.	6 M	CO2	L3
9(a)	Explain various scheduling algorithms used in real-time systems.	6 M	CO4	L2
(b)	Discuss synchronization mechanisms in RTOS: semaphores, mutexes, and mailboxes.	6 M	CO4	L2
(OR)				
10(a)	Explain inter-process communication mechanisms such as message queues, pipes, and signals.	6 M	CO4	L2
(b)	Explain priority inversion problem with suitable example and discuss its solutions.	6 M	CO4	L2

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M.Tech. (I Semester) Regular Examinations

D251AQ02-ADVANCED FLUID MECHANICS

(TPE)

Time : 3 hours

Max. Marks : 60

Q.No	All questions carry equal marks	Marks	CO	BL
1(a)	Distinguish between Eulerian and Lagrangian descriptions of fluid motion. Discuss their advantages and limitations.	6M	CO1	L2
(b)	The velocity potential is given by $\phi = 3x^2 - 3y^2$. Find velocity components and verify whether Laplace equation is satisfied.	6M	CO1	L3
(OR)				
2(a)	Explain the concept of flow nets and describe their construction for two-dimensional irrotational flow.	6M	CO1	L2
(b)	Discuss the limitations and assumptions of flow nets in engineering analysis.	6M	CO1	L2
3.	Starting from Navier–Stokes equation, derive the condition for laminar flow and obtain the expression for Reynolds number for pipe flow.	12M	CO2	L3
(OR)				
4(a)	Discuss the basic differences between the Eulers equations of motion and Navier stokes equation.	6M	CO2	L2
(b)	Show that the discharge per unit width between two parallel plates distance h apart, when one plate is moving at velocity 'U' while the other one is held stationary, for the condition of zero shear stress at the fixed plate is $q=hU/3$.	6M	CO2	L3
5(a)	Discuss the role of boundary layer in drag reduction.	6M	CO3	L2
(b)	Discuss the characteristics of laminar boundary layer over a flat plate.	6M	CO3	L2
(OR)				
6(a)	Derive the drag on a flat plate due to laminar and turbulent boundary layers.	6M	CO3	L3
(b)	State and explain Prandtl's boundary layer assumptions.	6M	CO3	L2
7(a)	Distinguish between Isentropic flow, Fanno flow and Rayleigh flow.	6M	CO4	L2
(b)	Derive relation between pressure ratio and Mach number in isentropic flow.	6M	CO4	L3
(OR)				
8.	Derive governing equations of Rayleigh flow and explain variation of Mach number due to heat addition.	12M	CO4	L3
9(a)	Explain working principle of micro mixers.	6M	CO5	L2
(b)	Discuss different types of actuators used in microfluidics.	6M	CO5	L2
(OR)				
10(a)	Discuss advantages and applications of microfluidic systems.	6M	CO5	L1
(b)	Explain the principle of electrokinetic flow and its importance.	6M	CO5	L2

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LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING(AUTONOMOUS)

L.B. Reddy Nagar :: Mylavaram – 521 230 :: NTR Dist.:: A.P.

M.Tech. (I Semester) Regular Examinations

D2518803-ARTIFICIAL INTELLIGENCE

(DS)

Bocool
13/3/26

Time : 3 hours

Max. Marks : 60

Q.No	All questions carry equal marks	Marks	CO	BL
1(a)	Explain various applications of Artificial Intelligence in real-world domains.	6 M	CO1	L2
(b)	Discuss the state-space representation of the Tic-Tac-Toe game.	6 M	CO1	L2
(OR)				
2(a)	Explain heuristic search techniques with suitable examples.	6 M	CO1	L2
(b)	Describe the components and formulation of Constraint Satisfaction Problem.	6 M	CO1	L2
(OR)				
3(a)	Explain the concept of problem reduction using AND-OR graphs with an example.	6M	CO2	L3
(b)	Differentiate between propositional logic and predicate logic.	6M	CO2	L2
(OR)				
4(a)	What is an axiomatic system? Explain its structure and working.	6M	CO2	L2
(b)	Explain predicates, constants, variables, and quantifiers with examples.	6M	CO2	L2
(OR)				
5(a)	Compare declarative and procedural knowledge representation methods.	6M	CO3	L2
(b)	Define semantic networks and explain their structure with an example.	6M	CO3	L2
(OR)				
6(a)	Explain the need for advanced knowledge representation techniques in AI.	6M	CO3	L2
(b)	What is Cyc Theory? Explain its objectives in knowledge representation.	6M	CO3	L2
(OR)				
7(a)	Explain how uncertainty is represented using Bayesian networks.	6M	CO5	L3
(b)	Compare Dempster-Shafer theory with Bayesian probability.	6M	CO5	L2
(OR)				
8(a)	Explain non-monotonic reasoning with suitable examples.	6M	CO5	L2
(b)	Discuss various types of TMS.	6M	CO5	L2
(OR)				
9(a)	Discuss the evolution and importance of expert systems in Artificial Intelligence.	6M	CO4	L2
(b)	Describe forward chaining and backward chaining in expert systems.	6M	CO4	L2
(OR)				
10(a)	Describe various methods of knowledge acquisition.	6M	CO4	L2
(b)	Explain the role of machine learning in expert systems.	6M	CO4	L2

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L.B. Reddy Nagar :: Mylavaram – 521 230 :: NTR Dist.:: A.P.

M.Tech. (I Semester) Regular Examinations

D251AN03-ELECTRIC VEHICLES

(PE&ED)

Time : 3 hours

Max. Marks : 60

Q.No	All questions carry equal marks	Marks	CO	BL
1(a)	Analyze the need for hybridization of vehicles.	6M	CO1	L4
(b)	Illustrate the fundamentals of a conventional vehicle.	6M	CO1	L2
(OR)				
2(a)	Correlate various drive cycles used in evaluating HEV performance.	6M	CO1	L4
(b)	Examine the advantages and applications of electric vehicles in modern transportation.	6M	CO1	L4
(OR)				
3.	Contrast different architectures of Hybrid Electric Vehicles with advantages and limitations.	12M	CO2	L4
(OR)				
4(a)	Compare the design considerations of HEVs and PHEVs.	6M	CO2	L4
(b)	Interpret the components and integration of a fuel cell stack in HEVs.	6M	CO2	L2
(OR)				
5(a)	Differentiate various types of motors used in the powertrain of Electric Vehicles.	6M	CO3	L4
(b)	Explain the factors that influence the design of Motor Control Units (MCU) in two-wheeled Electric Vehicles.	6M	CO3	L2
(OR)				
6(a)	Contrast regenerative braking with traditional braking systems in Electric Vehicles.	6M	CO3	L4
(b)	Analyze the key characteristics of motors used in Electric Vehicles and discuss their importance in achieving energy efficiency and performance goals.	6M	CO3	L4
(OR)				
7(a)	Distinguish between voltage source inverters and current source inverters.	6M	CO3	L4
(b)	Illustrate the operation of EV battery chargers with block diagrams.	6M	CO3	L2
(OR)				
8.	Deconstruct the design and operation of isolated bidirectional DC-DC converters.	12M	CO3	L4
(OR)				
9(a)	Classify the batteries used in hybrid electric vehicles and examine their behavior in HEVs.	6M	CO4	L4
(b)	Describe the working of pumped hydro energy storage with diagram.	6M	CO4	L2
(OR)				
10(a)	Analyze the characteristics and applications of ultra-capacitors.	6M	CO4	L4
(b)	Examine the relation between thermal energy storage and storage heat.	6M	CO4	L4

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L.B. Reddy Nagar :: Mylavaram – 521 230 :: NTR Dist.:: A.P.

M.Tech. (I Semester) Regular Examinations

D251AP03-FPGA DESIGN

(VLSI&ESD)

15/3/26

Time : 3 hours

Max. Marks : 60

Q.No	All questions carry equal marks	Marks	CO	BL
1(a)	Explain the concept of Field Programmable Gate Arrays (FPGAs) and discuss their advantages over fixed-function ICs.	6M	CO1	L2
(b)	Discuss the evolution of programmable logic devices from PROMs to modern FPGAs.	6M	CO1	L2
(OR)				
2(a)	Discuss the complete FPGA design flow with a neat block diagram.	6M	CO1	L2
(b)	Describe the structure and functionality of Look-Up Tables (LUTs) in FPGAs.	6M	CO1	L2
(OR)				
3(a)	Compare FPGA and CPLD architectures and explain how their structures influence their applications.	6M	CO2	L2
(b)	Explain the architectural features of Xilinx Virtex and Spartan FPGA families.	6M	CO2	L2
(OR)				
4(a)	Compare different programming technologies used in programmable logic devices.	6M	CO2	L2
(b)	Discuss the architecture and features of Altera FPGA and CPLD devices.	6M	CO2	L2
(OR)				
5(a)	Discuss how CPLD building blocks are used to implement digital circuits.	6M	CO2	L3
(b)	Describe the structure and functions of Input/Output Blocks (IOBs) in FPGA devices.	6M	CO2	L3
(OR)				
6(a)	Explain the internal building blocks of FPGA used for implementing logic functions.	6M	CO2	L3
(b)	Discuss the impact of logic block functionality on FPGA performance.	6M	CO2	L2
(OR)				
7(a)	Illustrate routing in symmetrical FPGAs with an example.	6M	CO3	L3
(b)	Describe routing structures used in row-based FPGA architectures.	6M	CO3	L3
(OR)				
8.	Define the following routing terms: (i) Routing channel (ii) Routing switch (iii) Wire segment (iv) Track (v) Pin (vi) Net.	12M	CO3	L2
(OR)				
9(a)	Explain the architectural assumptions used in FPGA design.	6M	CO4	L2
(b)	Describe the organization of logic blocks including LUTs, multiplexers, and flip-flops.	6M	CO4	L2
(OR)				
10(a)	Describe about connection block topologies used in FPGA architectures.	6M	CO4	L3
(b)	Compare different switch block topologies used in FPGA routing architectures.	6M	CO4	L2

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M.Tech. (I Semester) Regular Examinations

D251AQ03-ADVANCED HEAT AND MASS TRANSFER

(TPE)

Answer
13/3/26

Time : 3 hours

Max. Marks : 60

Q.No	All questions carry equal marks	Marks	CO	BL
1(a)	Describe the working principle and design concept of micro heat exchangers.	6 M	CO1	L2
(b)	A 10 cm thick wall has thermal conductivity $k=0.8 \text{ W/mK}$. Calculate the heat transfer rate through a $2 \text{ m} \times 3 \text{ m}$ wall if temperatures on both sides are 100°C and 20°C .	6 M	CO1	L3
(OR)				
2(a)	Explain the applications of microscale heat transfer in modern technology.	6 M	CO1	L2
(b)	Gas flows in a microchannel of diameter $2 \mu\text{m}$. The mean free path of the gas molecules is $0.05 \mu\text{m}$. Calculate the Knudsen number and identify the flow regime.	6 M	CO1	L3
(OR)				
2(a)	Discuss convective heat transfer in microtubes and microchannels.	6 M	CO2	L2
(b)	Microchannel heat sink (50 channels, $D_h=100 \mu\text{m}$, $L=2 \text{ cm}$) cools 200 W chip. Water properties: $\rho=1000 \text{ kg/m}^3$, $C_p=4200 \text{ J/kgK}$, $\mu=0.001 \text{ Pa.s}$. Find: (i) required mass flow rate for $\Delta T=15^\circ\text{C}$, (ii) pressure drop ($f=0.03$), (iii) pumping power.	6 M	CO2	L3
(OR)				
4(a)	Water flows through a microchannel of hydraulic diameter $200 \mu\text{m}$ with velocity 0.8 m/s . If the kinematic viscosity is $1 \times 10^{-6} \text{ m}^2/\text{s}$. Determine the Reynolds number and comment on the flow regime.	6 M	CO2	L3
(b)	Discuss the experimental observations of flow and heat transfer characteristics in microchannels.	6 M	CO2	L2
(OR)				
5(a)	Differentiate between the conventional channels and microchannels.	6 M	CO3	L2
(b)	Describe the boiling curve in microchannels and explain the various boiling regimes, including the concept and significance of Critical Heat Flux (CHF).	6 M	CO3	L2
(OR)				
6(a)	Describe the construction and operation of micro heat pipes and explain their advantages in thermal management.	6 M	CO3	L2
(b)	A microchannel heat sink experiences a maximum heat flux of 1.2 MW/m^2 before burnout occurs. If the heated surface area is 0.002 m^2 , determine the maximum heat transfer rate before reaching CHF.	6 M	CO3	L3
(OR)				
7(a)	Explain the basic principles of thermal radiation and discuss the nature and characteristics of radiative heat transfer.	6 M	CO4	L2
(b)	What is radiation shape factor and explain the reciprocity theorem?	6 M	CO4	L2
(OR)				
8(a)	Differentiate the parallel, counter and cross flow heat exchangers with the help of sketch.	6 M	CO4	L2
(b)	Water enters a counter-flow double pipe heat exchanger at 30°C and leaves at 70°C . Hot oil enters at 120°C and leaves at 80°C . The overall heat transfer coefficient is $400 \text{ W/m}^2\text{K}$. The heat transfer rate is 25 kW . Determine the Log Mean Temperature Difference (LMTD) and heat transfer area.	6 M	CO4	L3
(OR)				
9(a)	Describe the fundamental concepts of mass transfer and discuss the mechanisms of diffusion and convective mass transfer with suitable examples.	6 M	CO5	L2
(b)	State and derive Fick's First Law of diffusion and explain Fick's law as applied to ideal gas mixtures.	6 M	CO5	L2
(OR)				
10(a)	Explain the concept of transpiration cooling and its applications in high-temperature systems such as gas turbines and rocket engines.	6 M	CO5	L2
(b)	The concentration of a gas changes from 2 kmol/m^3 to 1 kmol/m^3 over a distance of 0.01 m . The diffusion coefficient is $2 \times 10^{-5} \text{ m}^2/\text{s}$. Calculate the mass diffusion flux using Fick's law.	6 M	CO5	L3

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L.B. Reddy Nagar :: Mylavaram – 521 230 :: NTR Dist.:: A.P.

M.Tech. (I Semester) Regular Examinations

D25188A0-AGILE METHODOLOGIES

(DS)

Answer
16/3/26

Time : 3 hours

Max. Marks : 60

Q.No	All questions carry equal marks	Marks	CO	BL
1(a)	Discuss Agile values and their importance in software development.	6M	CO1	L2
(b)	Apply Agile methodology to overcome issues in traditional development.	6M	CO1	L3
(OR)				
2(a)	Analyze how 'Responding to Change' provides competitive advantage.	6M	CO2	L3
(b)	Illustrate how Agile principles improve customer collaboration.	6M	CO2	L3
3.	Elaborate the 12 Agile Principles and analyze their role in project execution.	12M	CO2	L3
(OR)				
4(a)	Describe how effective communication strengthens Agile teams.	6M	CO2	L3
(b)	Analyze how continuous improvement enhances Agile performance.	6M	CO2	L3
5(a)	Elaborate on the roles and responsibilities in Scrum and how they support self-organizing teams.	6M	CO2	L3
(b)	Describe Sprint planning and retrospectives in Scrum.	6M	CO2	L2
(OR)				
6(a)	Describe User Stories, Story Points, and Velocity in Scrum.	6M	CO2	L2
(b)	Analyze how Burndown Charts help monitor Sprint progress.	6M	CO2	L3
7(a)	Demonstrate Refactoring and Code Smells with examples.	6M	CO3	L3
(b)	Discuss Continuous Integration and its benefits.	6M	CO3	L2
(OR)				
8.	Describe XP primary practices and analyze how they improve code quality.	12M	CO3	L3
9(a)	Describe Lean thinking and elimination of waste in detail.	6M	CO4	L3
(b)	Elaborate Kanban principles and WIP limits.	6M	CO4	L3
(OR)				
10.	Analyze Value Stream Mapping and flow management in Lean systems.	12M	CO4	L3

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M.Tech. (I Semester) Regular Examinations

**D251ANA1-POWER QUALITY ENHANCEMENT USING CUSTOM POWER DEVICES
(PE&ED)**

Time : 3 hours

Max. Marks : 60

Q.No	All questions carry equal marks	Marks	CO	BL
1(a)	Illustrate the general classes of power quality disturbances in a power system with examples.	6M	CO1	L3
(b)	Analyze the effectiveness of different solutions in improving voltage sag performance and system reliability.	6M	CO1	L4
(OR)				
2(a)	Define and discuss the significance of the following power quality terms (i) frequency deviation (ii) interruption (iii) harmonic distortion (iv) impulsive transient	6M	CO1	L2
(b)	Analyze the different stages involved in the power quality evaluation process.	6M	CO1	L4
(OR)				
3(a)	Demonstrating the principles of overvoltage protection.	6M	CO2	L2
(b)	Illustrate how the installation of shunt capacitors leads to voltage rise in a distribution feeder.	6M	CO2	L3
(OR)				
4(a)	Discuss the Principles of Regulating the Voltage for a Weak Power System.	6M	CO2	L2
(b)	Discuss the common strategies to reduce the impact of lightning on Utility System.	6M	CO2	L3
(OR)				
5(a)	Illustrate the process of harmonic generation in a fluorescent lamp with magnetic ballast and its impact on power quality.	6M	CO3	L3
(b)	Describe how PWM AC drive generate harmonics and its effects on power quality.	6M	CO3	L3
(OR)				
6(a)	Describe the procedure for evaluating voltage limits of harmonics in a utility power system.	6M	CO3	L3
(b)	Illustrate how three phase power converters generate harmonics and its affects on power quality.	6M	CO3	L3
(OR)				
7(a)	Illustrate the operation of a Voltage Source Inverter in a custom power device.	6M	CO4	L3
(b)	Analyze the role of Voltage Source Inverters in reactive power compensation.	6M	CO4	L4
(OR)				
8(a)	Demonstrate how a Thyristor Switched Capacitor (TSC) operate in reactive power control.	6M	CO4	L3
(b)	Illustrate the use of shunt compensators in distribution systems.	6M	CO4	L3
(OR)				
9(a)	Illustrate how a Generalized Power Quality Conditioner operates to mitigate power quality issues in a distribution system.	6M	CO5	L3
(b)	Analyze the concept of a Solid-State Current Limiter to protect a power system during fault conditions.	6M	CO5	L4
(OR)				
10(a)	Demonstrate how an Interline Power Flow Controller (IPFC) controls real and reactive power flow in interconnected transmission systems.	6M	CO5	L3
(b)	Illustrate the operation of a Solid-State Breaker in interrupting fault currents.	6M	CO5	L3

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M.Tech. (I Semester) Regular Examinations

D251APA3-VLSI TESTING & TESTABILITY

(VLSI&ESD)

Ravoor
16/3/26

Time : 3 hours

Max. Marks : 60

Q.No	All questions carry equal marks	Marks	CO	BL
1(a)	Explain how Design for Testability (DFT) techniques influence the VLSI design cycle.	6M	CO1	L2
(b)	Compare logic-level and register-level functional modeling approaches.	6M	CO1	L2
(OR)				
2(a)	Summarize various types of testing such as functional testing, structural testing, parametric testing, and burn-in testing.	6M	CO1	L2
(b)	Illustrate the concept of logic simulation and its role in digital circuit design.	6M	CO1	L2
(OR)				
3(a)	Interpret the role of fault simulation in validating ATPG-generated test patterns.	6M	CO2	L2
(b)	Outline the working principle of Parallel Fault Simulation.	6M	CO2	L2
(OR)				
4(a)	Describe the procedure of serial fault simulation for single stuck-at faults.	6M	CO2	L2
(b)	Summarize the advantages and disadvantages of deductive fault simulation.	6M	CO2	L2
(OR)				
5(a)	Illustrate various fault models used in combinational circuit testing and explain their significance in test generation.	6M	CO3	L2
(b)	Demonstrate the challenges involved in sequential circuit testing compared to combinational circuit testing.	6M	CO3	L2
(OR)				
6(a)	Interpret different types of ATPG algorithms used for combinational circuits.	6M	CO3	L2
(b)	Illustrate with examples how multi-valued logic simplifies fault simulation.	6M	CO3	L3
(OR)				
7(a)	Summarize the five-valued logic system for D-Algorithm, D-frontier concept, fault activation, propagation, and justification steps in detail.	6M	CO4	L2
(b)	Outline the impact of DFT techniques on fault coverage, test time, and manufacturing cost.	6M	CO4	L2
(OR)				
8(a)	With a suitable example, illustrate the step-by-step procedure of generating a test vector using the PODEM algorithm.	6M	CO4	L2
(b)	Compare D-Algorithm, PODEM, and FAN algorithms with respect to search space, backtracking, efficiency, and practical applicability.	6M	CO4	L2
(OR)				
9(a)	Interpret the full scan and partial scan techniques. Compare their advantages, disadvantages, and applications.	6M	CO5	L2
(b)	Draw the general BIST architecture and explain the function of each component.	6M	CO5	L2
(OR)				
10(a)	Illustrate the architecture and working principle of Circular BIST (CBIST) with suitable diagrams.	6M	CO5	L2
(b)	Summarize the procedure for generating and applying test patterns to embedded RAMs.	6M	CO5	L2

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L.B. Reddy Nagar :: Mylavaram – 521 230 :: NTR Dist.:: A.P.

M.Tech. (I Semester) Regular Examinations

D251AQAO-POWER PLANT MANAGEMENT
(TPE)*Boorvel*
16/3/26

Time : 3 hours

Max. Marks : 60

Q.No	All questions carry equal marks	Marks	CO	BL
1(a)	Elucidate the concept of cost in managerial economics.	6M	CO1	L2
(b)	A machine costing Rs 24,000 was purchased on 1st December 1985. The installation and erection charges were Rs 1000 and its useful life is expected to be 10 years. The scrap value of the machine at the end of the useful life is Rs 5000. Compute the depreciation and the book value for the period 6.	6M	CO1	L3
(OR)				
2(a)	Differentiate the accounting profit and the economic profit with examples.	6M	CO1	L2
(b)	The first cost of a road laying machine is Rs 60,00,000/-. Its salvage value after 5 years of service is Rs. 40,000/-. The length of road that can be laid by the machine during the lifetime is 55,000km. In its third year of operation the length of road laid is 1500 km. Find the depreciation of the equipment for that year	6M	CO1	L3
3.	Machine A, operated manually costs Rs. 2000 has a life of 2 years. While an automatic machine B costs Rs. 3000 but has a life of 4 years. Operating cost for machine A is Rs. 4000 per year while of machine B is Rs. 3000 only. Which should be purchased? Consider 10% interest.	12M	CO2	L3
(OR)				
4(a)	Explicate the concept of group replacement systems and how they differ from individual replacement.	6M	CO2	L2
(b)	Describe the rate of return method of equipment replacement analysis. Mention its advantages.	6M	CO2	L2
5(a)	Define the term "Budgetary Control". Discuss the steps which you require to follow for budgetary control.	6M	CO3	L2
(b)	Explicate the purpose of Budgetary Control and show its advantages to a large-scale manufacturing concern.	6M	CO3	L2
(OR)				
6(a)	Explain the preparation, implementation, and monitoring stages of budgetary control.	6M	CO3	L2
(b)	Discuss the assumptions underlying break-even analysis.	6M	CO3	L2
7(a)	Elaborate the techniques of energy demand management such as load leveling, peak clipping, valley filling, and strategic conservation with suitable examples.	6M	CO4	L2
(b)	Describe the methods of reducing energy cost in a power plant.	6M	CO4	L2
(OR)				
8(a)	State the advantages and limitations of energy demand management in thermal power plants.	6M	CO4	L1
(b)	Define the term "energy crisis". Discuss the causes of energy crisis in power generation systems.	6M	CO4	L2
9(a)	Elucidate the purposes and objectives of training for power plant personnel.	6M	CO5	L2
(b)	Describe the objectives and salient features of the Indian Electricity Act, 1910.	6M	CO5	L2
(OR)				
10(a)	Enlist the functions and responsibilities of the maintenance engineering department in a power plant.	6M	CO5	L2
(b)	Define the term "material management". Explain its objectives in a power plant.	6M	CO5	L2

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M.Tech. (I Semester) Regular Examinations

D25188B0-FULL STACK TECHNOLOGIES

(DS)

Receipt
18/3/26

Time : 3 hours

Max. Marks : 60

Q.No	All questions carry equal marks	Marks	CO	BL
1(a)	Describe the Document Object Model (DOM) and SAX approaches for parsing XML. Provide advantages of each in web development contexts.	6M	CO1	L2
(b)	Differentiate between XML Schema and DTD. How does XSLT transform XML documents?	6M	CO1	L3
(OR)				
2(a)	Describe the role of HTTP, FTP, and SMTP protocols in web communication.	6M	CO1	L2
(b)	Explain the role of DNS in resolving web addresses.	6M	CO1	L2
(OR)				
3(a)	Write a JavaScript function to reverse a string and check if it's a palindrome.	6M	CO2	L3
(b)	Write a java script to display the denomination of the amount deposited in the bank in terms of 100's, 50's, 20's, 10's, 5's, 2's & 1's. (Eg: If the deposited amount is Rs.163, the output should be 1-100's, 1-50's, 1- 10's, 1-2's & 1-1's).	6M	CO2	L3
(OR)				
4(a)	Discuss the working of \$eval service in AngularJS with suitable examples.	6M	CO2	L2
(b)	Describe AngularJS form validation techniques with an example application.	6M	CO2	L2
(OR)				
5(a)	Write a PHP script to connect to a MySQL database and insert user data securely using prepared statements.	6M	CO3	L3
(b)	Compare PHP and Node.js in terms of execution model, scalability, and performance.	6M	CO3	L3
(OR)				
6(a)	Develop a PHP script to process a form with name, email, and phone fields, validating email format and displaying results in a table.	6M	CO3	L3
(b)	Explain Node.js modules and process model. Write code to create a simple HTTP server handling GET requests.	6M	CO3	L2
(OR)				
7(a)	Write MySQL queries using aggregate functions (AVG, MAX) and GROUP BY to analyze employee salaries by department from 'employees' and 'departments' tables.	6M	CO4	L3
(b)	Differentiate INNER JOIN, LEFT JOIN, and FULL OUTER JOIN with query examples on sample tables.	6M	CO4	L2
(OR)				
8(a)	Write jQuery code to toggle visibility of a div on button click.	6M	CO4	L2
(b)	Write jQuery code to change background color on mouseover.	6M	CO4	L2
(OR)				
9(a)	Discuss in detail MongoDB architecture and features. Contrast it with MySQL using document vs. relational models.	6M	CO5	L2
(b)	Compare SOAP and RESTful web services, explaining WSDL's role in SOAP.	6M	CO5	L3
(OR)				
10(a)	Illustrate the steps to deploy a web app using cloud platforms.	6M	CO5	L3
(b)	Write MongoDB commands to create a collection and insert documents.	6M	CO5	L2

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M.Tech. (I Semester) Regular Examinations

D251ANB0-RENEWABLE ENERGY TECHNOLOGIES

(PE&ED)

Time : 3 hours

Max. Marks : 60

Q.No	All questions carry equal marks	Marks	CO	BL
1(a)	Illustrate the qualitative analysis of the issues that drives the effects of DG on a transmission system.	6M	CO1	L4
(b)	Analyze the control strategy of renewable energy using power systems.	6M	CO1	L3
(OR)				
2(a)	Describe the calculation of electricity generation costs.	6M	CO1	L4
(b)	Discuss the various renewable energy sources in the market.	6M	CO1	L3
(OR)				
3.	Derive the equation of power and losses of induction generator.	12M	CO2	L3
(OR)				
4(a)	Elaborate the self-excitation process of induction generator.	6M	CO2	L4
(b)	Distinguish between interconnected and stand-alone operations of induction machines.	6M	CO2	L3
(OR)				
5(a)	Analyze the meteorological maps with the distribution of power and wind speed.	6M	CO3	L4
(b)	Discuss the importance of drag and lifting turbines.	6M	CO3	L2
(OR)				
6(a)	Analyze the characteristics of turbine rotation and rotor power with respect to wind speed.	6M	CO3	L4
(b)	Discuss the key factors for choosing the optimal location for wind turbines.	6M	CO3	L2
(OR)				
7(a)	Analyze the short circuit current with the temperature of a PV cell.	6M	CO3	L4
(b)	Elaborate the model of PV panel consisting of 'n' cells in parallel.	6M	CO3	L3
(OR)				
8.	Analyze the equation of conversion efficiency at maximum power of PV cell.	12M	CO3	L4
(OR)				
9(a)	Analyze the electrochemical action of various fuel cells with the temperature.	6M	CO4	L4
(b)	Describe the working of a small fuel cell power plant.	6M	CO4	L3
(OR)				
10(a)	Illustrate the aspects of hydrogen gas as fuel.	6M	CO4	L2
(b)	List the benefits and drawbacks of fuel cell.	6M	CO4	L2

18 MAR 2026

H.T.No

R25

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING(AUTONOMOUS)

L.B. Reddy Nagar :: Mylavaram – 521 230 :: NTR Dist.:: A.P.

M.Tech. (I Semester) Regular Examinations

D251APB3-CRYPTOGRAPHY AND NETWORK SECURITY
(VLSI&ESD)

Time : 3 hours

Max. Marks : 60

Q.No	All questions carry equal marks	Marks	CO	BL
1(a)	List and briefly discuss the Security Services & Its mechanisms.	6M	CO1	L2
(b)	What is a Symmetric Cipher? Discuss Symmetric Cipher model with neat sketch.	6M	CO1	L2
(OR)				
2(a)	Explain different Polyalphabetic Ciphers with suitable example.	6M	CO1	L2
(b)	Explain the Mono Alphabetic Cipher substitution technique with an example.	6M	CO1	L2
3.	Briefly Explain Euclidian and Extended Euclidian algorithm with suitable examples.	12M	CO2	L3
(OR)				
4(a)	State and prove Fermat's theorem.	6M	CO2	L3
(b)	What is Euler's totient Function? How to compute Euler's totient and represent in number theory?	6M	CO2	L4
5(a)	Explain Triple DES with suitable example.	6M	CO3	L2
(b)	Explain different Block Cipher modes of operations.	6M	CO3	L2
(OR)				
6(a)	Briefly Discuss the Linear Cryptanalysis and Differential Cryptanalysis.	6M	CO3	L2
(b)	Explain RC4 Stream Cipher Design process.	6M	CO3	L2
7(a)	Describe and discuss four general categories of schemes for the distribution of public keys.	6M	CO4	L3
(b)	What is a Hash Function? Discuss the types of hash Functions.	6M	CO4	L2
(OR)				
8.	Explain how to generate message digest using MD5 Algorithm and compare it to Secure Hash Algorithm (SHA-1).	12M	CO4	L3
9(a)	List and briefly discuss the different classes of intruders.	6M	CO5	L3
(b)	Describe different types of Firewalls and discuss any one Firewall.	6M	CO5	L2
(OR)				
10(a)	What is a Digital Signature? Discuss different types Digital Signatures.	6M	CO5	L3
(b)	Explain Encapsulating Security Payload Format with neat sketch.	6M	CO5	L2

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M.Tech. (I Semester) Regular Examinations

D251AQB0-SOLAR ENERGY

(TPE)

*Revised
18/3/24*

Time : 3 hours

Max. Marks : 60

Q.No	All questions carry equal marks	Marks	CO	BL
1(a)	Discuss the role of solar energy in the context of present world energy status.	6M	CO1	L2
(b)	Describe the sun earth relationships with suitable diagrams.	6M	CO1	L2
(OR)				
2(a)	Explain about the extraterrestrial radiation and its effect on atmosphere.	6M	CO1	L2
(b)	With diagrams discuss the different sun-earth angles.	6M	CO1	L2
(OR)				
3.	Derive an expression for the efficiency of a compound parabolic collector.	12M	CO2	L3
(OR)				
4(a)	Differentiate solar flat plate collectors and concentrating collectors.	6M	CO2	L2
(b)	Discuss about the top loss coefficient and heat losses in flat plate collector.	6M	CO2	L2
(OR)				
5(a)	Describe the solar cell with its salient features and applications.	6M	CO3	L2
(b)	List out the merits, demerits and applications of solar PV systems.	6M	CO3	L2
(OR)				
6(a)	Discuss the recent developments taking place in solar cells.	6M	CO3	L2
(b)	Illustrate the solar module and its important features.	6M	CO3	L2
(OR)				
7(a)	Enumerate the solar system optimization methods.	6M	CO4	L2
(b)	Discuss the importance of economic analysis in solar systems.	6M	CO4	L2
(OR)				
8.	Explain in detail the life cycle analysis of a solar system with example.	12M	CO4	L2
(OR)				
9(a)	Explain the power concepts of thermal power systems.	6M	CO5	L2
(b)	Discuss the design aspects considered for thermal power systems.	6M	CO5	L2
(OR)				
10.	Explain in detail about the operating difficulties and remedies of solar pond and solar still systems.	12M	CO5	L2
