

AR20**CODE: 20AIT404****SET-2****ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)****IV B.Tech I Semester Regular Examinations, November-2025****Deep Learning
(Honors /Minor)****Time: 3 Hours****Max Marks: 60**

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place

		Marks	CO	Blooms Level
<u>UNIT-I</u>				
1.	a) Define the neuron and explain linear perceptron.	5	1	2
	b) List the applications of Neural Networks.	5	1	1
(OR)				
2.	Explain in detail feed-forward neural networks and its applications.	10	1	2
<u>UNIT-II</u>				
3.	a) Compare Machine Learning and Deep Learning.	5	2	4
	b) List the types of Machine learning and explain in detail.	5	2	2
(OR)				
4.	a) Explain the applications of Machine Learning and Deep Learning.	5	2	2
	b) Differentiate classification and clustering.	5	2	4
<u>UNIT-III</u>				
5.	a) Discuss the convolution for image.	5	3	2
	b) Define padding and explain types of padding.	5	3	2
(OR)				
6.	a) Draw and explain the architecture of convolution neural network.	5	3	2
	b) List the applications of CNN.	5	3	1
<u>UNIT-IV</u>				
7.	a) Explain GRU in detail.	5	4	2
	b) Discuss Recurrent neural networks in detail with its applications.	5	4	2
(OR)				
8.	a) Explain Structure of LSTM with its applications.	5	4	2
	b) Discuss about Advanced GANs in detail.	5	4	2
<u>UNIT-V</u>				
9.	Demonstrate in detail AlexNet with architecture and explain its applications.	10	5	2
(OR)				
10.	Explain DenseNet and PixelNet in detail.	10	5	2
<u>UNIT-VI</u>				
11.	Explain application of Deep Learning through Automatic image captioning and image	10	6	2
(OR)				
12.	Discuss the Video to Text generation with LSTM models.	10	6	2

**Application Security
(Honors / Minor)****Time: 3 Hours****Max Marks: 60**

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place

	<u>UNIT-I</u>	Marks	CO	Blooms Level
1. a)	List and briefly explain Weak Points in Application Architecture.	5	CO 1	K2
b)	Describe the attack Cross-Site Scripting (XSS)	5	CO 1	K3
	(OR)			
2. a)	Clearly explain about Denial of Service (DoS) attack.	5	CO 1	K3
b)	Describe the Threats, and Attacks in application layer.	5	CO 1	K3
	<u>UNIT-II</u>			
3.	Explain the procedure of defending against XSS Attacks.	10	CO 2	K4
	(OR)			
4.	Explain the procedure of defending against Injection attacks.	10	CO 2	K3
	<u>UNIT-III</u>			
5.	Demonstrate the use of encoding techniques to prevent injection attacks.	10	CO 3	K2
	(OR)			
6.	Describe about Input Validation and Sanitization.	10	CO 3	K4
	<u>UNIT-IV</u>			
7.	Draw and explain Secure Software Development Lifecycle.	10	CO 4	K4
	(OR)			
8.	Compare different security testing tools for APIs and networks.	10	CO 4	K3
	<u>UNIT-V</u>			
9.	Explain the Objectives and Benefits of Threat Modelling.	10	CO 5	K3
	(OR)			
10. a)	Give the procedure of Testing Your Network.	5	CO 5	K4
b)	Describe how to Improve application Security.	5	CO 5	K3
	<u>UNIT-VI</u>			
11.	Explain about Integrating Threat Modelling Within the different types of SDLCs.	10	CO 5	K4
	(OR)			
12.	Differentiate between LAST, RASP, and WAF solutions.	10	CO 5	K4

**Time Series Analysis and Forecasting
(Honors / Minor)****Time: 3 Hours****Max Marks: 60**

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place

		Marks	CO	Blooms Level
<u>UNIT-I</u>				
1.	Describe in detail Models for Time Series Analysis	10	CO-1	K-1
(OR)				
2.	a) Explain Internal structures of time series	5	CO-1	K-1
	b) Explain Different Types of Data in Time series	5	CO-1	K-1
<u>UNIT-II</u>				
3.	a) Difference between Time Series Plots and Time Series Graphs.	5	CO-2	K-4
	b) Explain about Box Plot in detail	5	CO-2	K-1
(OR)				
4.	How would you evaluate the performance of a time series forecasting model in the presence of seasonality?	10	CO-2	K-3
<u>UNIT-III</u>				
5.	a) Explain the principle of least squares estimation in linear regression.	5	CO-3	K-1
	b) Explain the difference between simple linear regression and multiple linear regression in terms of least squares estimation.	5	CO-3	K-4
(OR)				
6.	Describe about First order and Second order Exponential Smoothing	10	CO-3	K-2
<u>UNIT-IV</u>				
7.	a) Summarize Invertibility of ARMA(p, q) Process	5	CO-4	K-2
	b) State four major steps of developing ARMA (p, q) model and explain each step.	5	CO-4	K-2
(OR)				
8.	Describe the concept of Forecasting using ARIMA process	10	CO-4	K-1
<u>UNIT-V</u>				
9.	Describe the process of selecting the best Seasonal ARIMA model for a given time series.	10	CO-5	K-3
(OR)				
10.	Compare impulse response functions for competing model.	10	CO-5	K-4
<u>UNIT-VI</u>				
11.	Describe the steps involved in building a Vector ARIMA model for forecasting	10	CO-6	K-1
(OR)				
12.	Correlate the concept of Neural Networks in Time Series Forecasting and Write any Model related to neural network.	10	CO-6	K-6

Time: 3 Hours

Max Marks: 60

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place

UNIT-I

- | | | Marks | CO | Blooms Level |
|-------|--|-------|----|--------------|
| 1. a) | Explain the performance of ICE vehicle traction power plant with the help of suitable characteristics. | 5M | 1 | K1 |
| b) | What are the advantages and disadvantages of internal combustion engines? | 5M | 1 | K2 |

(OR)

- | | | | | |
|-------|--|----|---|----|
| 2. a) | What are the various types of forces acting on electric vehicle and explain briefly? | 5M | 1 | K1 |
| b) | Compute forces due to drag, rolling resistance and gradient for the following vehicle assuming air density $\rho = 1.2 \text{ kg/m}^3$ and $\Theta = 7^\circ$ degrees. Determine the tractive effort for both the vehicles and analyze them. | 5M | 1 | K3 |

Vehicle	Gross vehicle weight	C_d	Frontal area	C_r	V(kmph)	Radius
3 wheeler	600	0.45	1.6	0.015	80	0.28
4 wheeler	1500	0.3	2.5	0.015	80	0.3

UNIT-II

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|-------|---|----|---|----|
| 3. a) | Explain the block diagram of parallel hybrid electric drive train topology. | 5M | 2 | K2 |
| b) | Explain the block diagram of complex hybrid electric drive train topology. | 5M | 2 | K2 |

(OR)

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|-------|--|----|---|----|
| 4. a) | Discuss about the Full hybrid vehicles with a neat architecture. | 5M | 2 | K2 |
| b) | What are the various types of Hybrid EV topologies and compare them? | 5M | 2 | K1 |

UNIT-III

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|-------|---|----|---|----|
| 5. a) | Explain the various types of drive train technologies based on power source configuration in electric vehicle. | 5M | 3 | K2 |
| b) | Comparisons between the drive train technologies based on power source configuration and drive train configuration in electric vehicle. | 5M | 3 | K3 |

(OR)

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|-------|--|----|---|----|
| 6. a) | Select the suitable operating modes of complex hybrid electric drive train topology and draw the architecture of complex hybrid electric drive train topology. | 5M | 3 | K2 |
| b) | Explain the architecture of parallel hybrid electric drive train topology. | 5M | 3 | K2 |

UNIT-IV

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|-------|--|----|---|----|
| 7. a) | Explain the following terms
i) State of charge ii) State of discharge iii) Depth of discharge
iv) Battery Energy | 5M | 4 | K2 |
| b) | Explain the operation of Fly wheel with a neat diagram. What are the advantages of Lead acid batteries over other batteries? | 5M | 4 | K2 |

(OR)

- | | | | | |
|-------|--|----|---|----|
| 8. a) | What are the advantages and disadvantages of fly wheel and Fuel cells? | 5M | 4 | K1 |
| b) | What are the various reasons for battery pack failure? | 5M | 4 | K1 |

UNIT-V

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|----|----|--|----|---|----|
| 9. | a) | Explain the operation of ultra - capacitors cascaded based converter with a suitable diagram | 5M | 5 | K2 |
| | b) | Explain the operation of multiple parallel converter with a suitable diagram | 5M | 5 | K2 |

(OR)

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|-----|----|---|----|---|----|
| 10. | a) | Comparisons between the multiple parallel converter and switched converter. | 5M | 5 | K3 |
| | b) | List out the various applications of converter configurations on hybrid energy systems. | 5M | 5 | K1 |

UNIT-VI

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|-----|----|--|----|---|----|
| 11. | a) | Discuss about the TYPE 1, TYPE 2 and TYPE 3 chargers for battery charging applications | 5M | 6 | K2 |
| | b) | Comparisons between AC type charging and DC type charging systems | 5M | 6 | K3 |

(OR)

- | | | | | | |
|-----|----|---|----|---|----|
| 12. | a) | Explain the operation of Integrated battery charging with a suitable diagram. | 5M | 6 | K2 |
| | b) | Explain the operation of Inductive battery charging or wireless battery charging with a suitable diagram. | 5M | 6 | K2 |

**IoT Security and Trust
(Honors /Minor)****Time: 3 Hours****Max Marks: 60**

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place

		Marks	CO	Blooms Level
<u>UNIT-I</u>				
1.	a) comparison of two symmetric algorithms (e.g., DES and AES), discussing their design, security features, and real-world applications?	5	CO1	2
	b) Simplify a comprehensive overview of the RSA algorithm within the context of public-key cryptography?	5	CO1	4
(OR)				
2.	a) Explain the relevance of historical developments in shaping current encryption methodologies?	5	CO1	2
	b) Analyze the mathematical principles underpinning RSA, particularly the use of prime numbers and modular arithmetic?	5	CO1	4
<u>UNIT-II</u>				
3.	a) Demonstrate a comparative analysis of the network security challenges faced by IoT in different environments.	5	CO2	2
	b) Explain the role of data integrity, confidentiality, and availability in securing IoT systems?	5	CO2	2
(OR)				
4.	a) Examine the security considerations for various network types in the context of IoT?	5	CO2	4
	b) Inspect the necessity of edge security in IoT environments?	5	CO2	4
<u>UNIT-III</u>				
5.	a) What are the key elements involved in an effective threat modeling process?	5	CO3	1
	b) Identify and describe the elementary blocks of IoT security that can mitigate these vulnerabilities?	5	CO3	3
(OR)				
6.	a) Show an example of a threat modeling framework and illustrate how it can be applied to a specific IoT application?	5	CO3	2
	b) Examine how each block contributes to the overall security posture of an IoT ecosystem?	5	CO3	4
<u>UNIT-IV</u>				
7.	a) Demonstrate the key characteristics of each model, including centralized, decentralized, and federated identity management systems?	5	CO4	2
	b) What specific considerations must be taken into account when managing identities for IoT devices?	5	CO4	1
(OR)				
8.	a) Construct the components of an identity management framework and their roles in securing digital identities?	5	CO4	3
	b) List the examples of identity management solutions that have been successfully implemented in IoT applications?	5	CO4	4

UNIT-V

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|-------------|----|--|---|-----|---|
| 9. | a) | Analyze the relationship between identity and trust in digital environments? | 5 | CO5 | 4 |
| | b) | Summarize the mutual establishment phases in cryptosystems? | 5 | CO5 | 2 |
| (OR) | | | | | |
| 10. | a) | How does identity management influence trust levels among users and systems? | 5 | CO5 | 1 |
| | b) | Illustrate the strengths and weaknesses of each approach, considering factors such as key exchange methods, vulnerability to attacks, and overall trustworthiness? | 5 | CO5 | 2 |

UNIT-VI

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|-------------|----|---|---|-----|---|
| 11. | a) | Discover the cyber crimes and categorize them into different types, such as identity theft, hacking, and cyberbullying? | 5 | CO6 | 4 |
| | b) | Identify the different types of hackers, including white-hat, black-hat, and gray-hat hackers. | 5 | CO6 | 3 |
| (OR) | | | | | |
| 12. | a) | How effective crime laws in addressing the challenges posed by cyber criminals? | 5 | CO6 | 1 |
| | b) | Outline the activities of these hackers impact organizations and individuals? | 5 | CO6 | 2 |

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

Answer ONE Question from each Unit

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<u>UNIT-I</u>		Marks	CO	Blooms Level
1.	Define Computer Vision and explain its basic components in detail.	10	1	Understanding
(OR)				
2.	a) Explain the Image Formation Model in Colour Cameras.	6	1	Understanding
	b) Describe the relationship between pixels in an image.	4	1	Understanding
<u>UNIT-II</u>				
3.	a) What are the fundamentals of Computer Vision?	4	2	Analysing
	b) Discuss the benefits, limitations, and applications of Tensor Flow in detail.	6	2	Understanding
(OR)				
4.	Explain the use of Neural Networks for Image Processing and their key components.	10	2	Applying
<u>UNIT-III</u>				
5.	Write short notes on the following: a) Filtering b) Restoration c) Morphing	10	3	Analysing
(OR)				
6.	Explain the concepts of Single View Geometry and Multiple View Geometry in Computer Vision, highlighting their differences, principles, and applications.	10	3	Understanding
<u>UNIT-IV</u>				
7.	What is the Robot Design Function? Discuss its components, significance, and how it impacts the functionality and performance of robotic systems.	10	4	Applying
(OR)				
8.	Discuss the social and environmental effects of design, highlighting its impact on communities, sustainability, and the natural environment.	10	4	Applying
<u>UNIT-V</u>				
9.	a) What are function approximation and system identification?	4	5	Analysing
	b) Discuss their principles, Benefits and Limitations	6	5	Understanding
(OR)				
10.	Discuss State Distribution Dynamics in Robot Vision and Image Processing, including its significance, methods of analysis, and impact on robotic perception and decision-making.	10	5	Applying
<u>UNIT-VI</u>				
11.	What is Robot Vision? Discuss its role in industrial automatic assembly and the ways it improves efficiency and productivity in manufacturing processes.	10	6	Applying
(OR)				
12.	Discuss the role of Inspection Systems in Robot Vision	5	6	Understanding
	What are miscellaneous mechanisms in the context of Robot Vision?	5	6	Analysing

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

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place

		Marks	CO	Blooms Level
<u>UNIT-I</u>				
1.	a) Explain the barriers and challenges in implementing smart buildings.	6	CO1	2
	b) Describe the significance of Fires safety and emergency warning systems.	4	CO1	2
(OR)				
2.	a) Illustrate various energy centric views contributing to smart buildings.	5	CO1	2
	b) Outline the systems of communication in the smart buildings.	5	CO1	2
<u>UNIT-II</u>				
3.	a) Recall the scope of smart waste management system.	5	CO2	1
	b) Explain the objectives of smart waste management system.	5	CO2	2
(OR)				
4.	a) Describe the role of IOT in waste collection and management system.	6	CO2	2
	b) Illustrate the concept of automatic waste collection system (AWCS).	4	CO2	2
<u>UNIT-III</u>				
5.	a) What are the different types of facilities for training and skill enhancement?	6	CO3	1
	b) Describe the role of smart economy in promoting innovation.	4	CO3	2
(OR)				
6.	a) Demonstrate how the smart economy effects the regular industrial practices.	5	CO3	2
	b) Explain the process of smart economy transformation.	5	CO3	2
<u>UNIT-IV</u>				
7.	a) Demonstrate the process of commissioning internet-based interactions in the smart governance.	5	CO4	2
	b) Explain how the smart governance helps in improving public delivery services.	5	CO4	2
(OR)				
8.	a) Demonstrate how GIS and GPS help in strengthening the smart governance.	5	CO4	2
	b) Illustrate the stake holder participation and collaboration for smart governance.	5	CO4	2
<u>UNIT-V</u>				
9.	a) How the heat islands are formed?	5	CO5	1
	b) Explain the use of smart technology for monitoring and managing urban noise.	5	CO5	2
(OR)				
10.	a) Describe the ICT framework for environmental management.	5	CO5	2
	b) Demonstrate the usage of smart technology in sustainable food production and consumption patterns.	5	CO5	2
<u>UNIT-VI</u>				
11.	a) Recall the ICT major technology areas.	5	CO6	1
	b) Explain the role of new devices and technologies in enhancing the ICT framework.	5	CO6	2
(OR)				
12.	a) Describe the role of sensor technologies in development of smart infrastructure.	6	CO6	2
	b) Explain the emerging technological challenges in ICT and IOT systems.	4	CO6	2

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place

		Marks	CO	Blooms Level
<u>UNIT-I</u>				
1.	a) Explain the importance of Design for Testability (DFT) in the ASIC design flow.	5	1	2
	b) Describe various manufacturing defects that can occur during chip fabrication. How can DFT help identify them?	5	1	2
(OR)				
2.	a) Illustrate the differences between fault, defect, and error with appropriate examples.	5	1	3
	b) Compare and contrast Verification and DFT with suitable examples.	5	1	3
<u>UNIT-II</u>				
3.	a) Apply scan DRC checks on a simple digital circuit and explain the violations detected and how to resolve them.	5	2	3
	b) Analyze the challenges faced in scan design and suggest solutions to optimize scan path insertion in complex digital circuits.	5	2	4
(OR)				
4.	a) Evaluate the impact of edge mixing and domain mixing on scan chain performance in multi-clock domain SoCs	5	2	6
	b) Design an implementation flow for scan insertion covering scan wrapper design and lock-up latch insertion.	5	2	5
<u>UNIT-III</u>				
5.	a) Illustrate how on-chip clocking supports scan compression.	5	3	3
	b) Evaluate the effectiveness of scan compression for low-power testing.	5	3	5
(OR)				
6.	a) Differentiate between EDT and conventional compression.	5	3	2
	b) Design a simple compression block diagram for a multi-domain scan design.	5	3	5
<u>UNIT-IV</u>				
7.	a) List types of ATPG untestable faults.	5	4	2
	b) Explain the difference between detected and possibly detected faults.	5	4	3
(OR)				
8.	a) Apply fault coverage formula to compute the efficiency of a test set.	5	4	4
	b) Analyze why some faults remain untestable even after ATPG.	5	4	4
<u>UNIT-V</u>				
9.	a) Develop a basic ATPG flow for a sequential circuit.	5	5	3
	b) Apply ATPG principles to detect stuck-at faults in a 3-input NAND gate	5	5	4
(OR)				
10.	a) Analyze the advantages and limitations of the D-algorithm.	5	5	4
	b) Evaluate backtracking strategies for complex circuits.	5	5	4
<u>UNIT-VI</u>				
11.	a) Explain the need for simulation in test verification.	5	6	3
	b) Apply boundary scan principles to detect interconnect faults.	5	6	4
(OR)				
12.	a) Analyze coverage improvement techniques in simulation.	5	6	4
	b) Evaluate the importance of JTAG in board-level testing	5	6	3

AR18

CODE: 18IET446

SET-1

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

IV B.Tech I Semester Supplementary Examinations, November-2025

**FUNDAMENTALS OF ROBOTICS
(Open Elective)**

Time: 3 Hours

Max Marks: 60

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place

UNIT-I

1. a) Explain the importance of Robotics in Automation. 6 M
b) What are the different components of industrial robotics? 6 M
- (OR)**
2. How do you specify a robot? Is robotics automation? Discuss the different classification systems of robots. 12 M

UNIT-II

3. Explain the various drive systems used with an industrial robot and compare their features, merits and demerits. 12 M
- (OR)**
4. a) How do you classify Tactile sensor? Explain them briefly with neat sketch. 6 M
b) Explain about Proximity and Range sensors in detail. 6 M

UNIT-III

5. a) Write homogenous transformation matrices for rotation in 3D. 6 M
b) What is homogenous transformation matrix? Explain four sub matrices. 6 M
- (OR)**
6. Determine the transformation matrix T that represents a translation of 'a' units along x-axis, followed by a rotation of β about x-axis and followed by a rotation of α about z-axis. 12 M

UNIT-IV

7. a) Explain about importance of Robot Programming lead through programming. 6 M
b) Explain the different types of Robot languages. 6 M
- (OR)**
8. a) Write down the capabilities and limitations of Lead through methods. 6 M
b) Discuss the software elements of robot and different teaching methods of robot. 6 M

UNIT-V

9. a) Describe the various considerations taken into account for material handling. 6 M
b) Enlist the applications and characteristics of future robots 6 M
- (OR)**
10. a) What are future manufacturing applications of robot? 6 M
b) Describe the Spray coating operation with robot system. 6 M