Hall Ticket No: | | | | | | | | | | |

Question Paper Code: 24MCAP109

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(UGC-AUTONOMOUS)

MCA II Year I Semester (R24) Regular End Semester Examinations, January - 2026

FULL STACK WEB DEVELOPMENT

Time: 3Hrs **Max Marks: 60**

Attempt all the questions. All parts of the question must be answered in one place only.
In Q.No 1 to 5 answer either A or B only

Q.No	Question	Marks	CO	BL
Q.1(A)	(i) Describe JavaScript objects with suitable examples.	6M	1	2
	(ii) Illustrate the structure and working of the DOM Tree in detail.	6M	1	3
	OR			
Q.1(B)	(i) Explain objects and Generators in JavaScript.	6M	1	2
	(ii) Define MERN Stack. Discuss the role of each technology (MongoDB, Express.js, React.js, Node.js) in full-stack web development.	6M	1	2
Q.2(A)	(i) Differentiate functional and class components with an example	6M	2	4
	(ii) Explain React CSS with suitable example	6M	2	3
	OR			
Q.2(B)	(i) Describe React forms and validation techniques.	6M	2	3
	(ii) Explain different ways of Designing components in React.	6M	2	3
Q.3(A)	(i) Define Node.js and explain its key features in detail.	6M	3	2
	(ii) Discuss in detail about Event emitter in Node.JS	6M	3	2
	OR			
Q.3(B)	(i) Discuss Express REST methods GET, POST, PUT, DELETE.	6M	3	2
	(ii) Write short notes on JSON.	6M	3	3
Q.4(A)	(i) Explain the concept of documents in MongoDB	6M	4	3
	(ii) Describe the MongoDB collections in detail	6M	4	2
	OR			
Q.4(B)	Explain CRUD operations in MongoDB with example	12M	4	3
Q.5(A)	Write in detail about Modularization and Webpack in React.	12M	5	4
	OR			
Q.5(B)	Briefly explain server-side rendering and session handling in react.	12M	5	3

***** END*****

Hall Ticket No: | | | | | | | | | | |

Question Paper Code: 24MCAP110

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(UGC-AUTONOMOUS)

MCA I Year I Semester (R24) Regular End Semester Examinations, January - 2026

DATA SCIENCE

Time: 3Hrs **Max Marks: 60**

Attempt all the questions. All parts of the question must be answered in one place only.
In Q.No 1 to 5 answer either A or B only

Q.No	Question	Marks	CO	BL
Q.1(A)	i) Explain the scope of Data Science with suitable examples	6M	1	2
	ii) Write short notes on Pandas Series and Data Frame with examples.	6M	1	2
	OR			
Q.1(B)	Describe how data is collected, cleaned, processed, analyzed, and visualized in a complete data science pipeline.	12M	1	2
Q.2(A)	i) Explain descriptive statistics used in EDA with examples	6M	2	2
	ii) Explain any two methods to handle missing data with suitable examples	6M	2	2
	OR			
Q.2(B)	Apply feature engineering techniques such as normalization, one-hot encoding, and PCA to any dataset and explain the outcomes.	12M	2	3
Q.3(A)	Analyze the difference between k-means and hierarchical clustering.	12M	3	4
	OR			
Q.3(B)	Solved the given Euclidean Distance Numerical example using K-Means clustering: A1(2,10), A2(2,5), A3(8,4), B1(5,8), B2(7,5), B3(6,4), C1(1,2), C2(4,9) a) Calculate the Euclidean distance of each point from both centroids. (b)Assign each point to the nearest cluster. (c) Compute the new centroids after the first iteration.	12M	3	3
Q.4(A)	Illustrate the creation of charts, reports, filters, and dashboards in Tableau.	12M	4	3
	OR			
Q.4(B)	Explain Tableau's architecture and interface in detail.	12M	4	4
Q.5(A)	i) Explain exponential smoothing and its types.	6M	5	2
	ii) Differentiate between ARMA and ARIMA models.	6M	5	2
	OR			
Q.5(B)	Explain how predictive analytics are applied in healthcare.	12M	5	3

***** END*****

Hall Ticket No: | | | | | | | | | | |

Question Paper Code: 24MCAP402

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(UGC-AUTONOMOUS)

MCA II Year I Semester (R24) Regular End Semester Examinations, January-2026

DEEP LEARNING

Time: 3Hrs **Max Marks: 60**

Attempt all the questions. All parts of the question must be answered in one place only.
In Q.No 1 to 5 answer either A or B only

Q.No	Question	Marks	CO	BL
Q.1(A)	Illustrate the architecture of a Deep Artificial Neural Network with a neat diagram.	12M	1	2
	OR			
Q.1(B)	Explain the impact of activation functions like ReLU, and tanh in learning.	12M	1	2
Q.2(A)	Break down the differences between Machine Learning and Deep Learning based on training time, data size, and human involvement in feature selection.	12M	2	4
	OR			
Q.2(B)	Create a conceptual deep learning pipeline for fraud detection and justify how multi-layer perceptron's contribute to improved accuracy.	12M	2	4
Q.3(A)	i) Describe channel attention in CNNs.	6M	3	2
	ii) Explain convolution and pooling operations with an example matrix.	6M	3	2
	OR			
Q.3(B)	Compare AlexNet and VGG16 architectures based on depth and parameters.	12M	3	4
Q.4(A)	i) Explain the unfolding of an RNN over time with suitable examples	6M	4	2
	ii) Explain the functioning of Gated Recurrent Units.	6M	4	2
	OR			
Q.4(B)	Distinguish between how LSTM and GRU handle long-term dependencies in sequential data.	12M	4	3
Q.5(A)	Evaluate the evolution of Word2Vec → ELMo → BERT/GPT and justify which model architecture best suits sentiment analysis and why.	12M	5	4
	OR			
Q.5(B)	Analyze Modern Large Language Models (LLMs) like GPT by writing a short note that examines their architecture, capabilities, and impact on real-world applications.	12M	5	4

***** END*****

Hall Ticket No: | | | | | | | | | | |

Question Paper Code: 24MCAP403

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(UGC-AUTONOMOUS)

MCA II Year I Semester (R24) Regular End Semester Examinations, January - 2026

DIGITAL FORENSICS

Time: 3Hrs **Max Marks: 60**

Attempt all the questions. All parts of the question must be answered in one place only.
In Q.No 1 to 5 answer either A or B only

Q.No	Question	Marks	CO	BL
Q.1(A)	Define digital forensics and explain its scope in modern cybercrime and traditional criminal investigations, giving suitable examples.	12M	1	2
	OR			
Q.1(B)	Classify different types of digital crimes and discuss the typical categories of digital evidence associated with each.	12M	1	2
Q.2(A)	Explain the difference between live data acquisition and static data acquisition in digital forensics, highlighting their advantages, limitations, and typical use cases.	12M	2	2
	OR			
Q.2(B)	Describe the step-by-step procedure for creating a forensic disk image, including the role of write blockers, documentation, and secure storage of the acquired image.	12M	2	3
Q.3(A)	Explain the process of RAM acquisition in digital forensics, including tools like Volatility or DumpIt, and discuss why RAM analysis is time-sensitive compared to disk forensics.	12M	3	2
	OR			
Q.3(B)	Compare Wireshark and TCPDUMP for network traffic analysis in forensics. Explain their key features, such as packet capture filters and export options, with examples of common forensic use cases.	12M	3	2
Q.4(A)	Explain the challenges forensic investigators face when acquiring data from locked Android and iOS devices, such as bootloader restrictions, encryption and secure enclaves.	12M	4	2
	OR			
Q.4(B)	Describe how to recover deleted SMS or call logs from SIM cards using magnetic stripe analysis or file carving and discuss chain-of-custody considerations for removable media.	12M	4	3
Q.5(A)	Explain the criteria for digital evidence admissibility in court and Discuss how chain of custody violations can lead to exclusion.	12M	5	2
	OR			
Q.5(B)	Detail the role and preparation of a digital forensics expert witness, including qualifying as an expert, handling direct/cross-examination, and using demonstrative aids like timelines or hash visualizations.	12M	5	4

***** END*****

Hall Ticket No: | | | | | | | | | | |

Question Paper Code: 24MCAP404

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(UGC-AUTONOMOUS)

MCA II Year I Semester (R24) Regular End Semester Examinations, January - 2026

EDGE COMPUTING

Time: 3Hrs **Max Marks: 60**

Attempt all the questions. All parts of the question must be answered in one place only.
In Q.No 1 to 5 answer either A or B only

Q.No	Question	Marks	CO	BL
Q.1(A)	Define Edge Computing. Explain the architecture of edge computing and discuss its key components with neat diagram.	12M	1	2
	OR			
Q.1(B)	What is Edge–Cloud collaboration? Discuss how edge and cloud work together to deliver scalable and low-latency applications.	12M	1	3
Q.2(A)	Describe edge device management. Explain how provisioning, configuration, and monitoring of edge devices support reliable system operation.	12M	2	3
	OR			
Q.2(B)	Explain the architectural requirements for deploying edge services at scale. Discuss the challenges in balancing computation and network load.	12M	2	2
Q.3(A)	Discuss major security vulnerabilities in edge computing. Explain how authentication and authorization mechanisms protect edge nodes.	12M	3	3
	OR			
Q.3(B)	Discuss edge access control models. Explain how role-based and attribute-based access control support secure edge operations.	12M	3	4
Q.4(A)	Explain CoAP's design principles. Describe how CoAP enables constrained IoT devices to communicate efficiently with edge nodes.	12M	4	3
	OR			
Q.4(B)	Explain the key features of 5G that support large-scale IoT deployments. Discuss how 5G edge integration improves network efficiency.	12M	4	3
Q.5(A)	Define edge orchestration. Explain how containerization and lightweight virtualization support edge application deployment.	12M	5	3
	OR			
Q.5(B)	Write short notes on:			
	i) Edge Cloud Integration.	4M	5	2
	ii) Real-time Edge Decision Making	4M	5	2
	iii) Edge Workload Distribution.	4M	5	2

***** END*****

Hall Ticket No: | | | | | | | | | | |

Question Paper Code: 24MCAP405

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(UGC-AUTONOMOUS)

MCA II Year I Semester (R24) Regular End Semester Examinations, January - 2026

GENERATIVE AI

Time: 3Hrs **Max Marks: 60**

Attempt all the questions. All parts of the question must be answered in one place only.
In Q.No 1 to 5 answer either A or B only

Q.No	Question	Marks	CO	BL
Q.1(A)	Explain in detail about Natural Language Processing with an example.	12M	1	4
	OR			
Q.1(B)	(i). List and explain Generative AI technologies.	6M	1	4
	(ii). Explain in detail about Deep Convolutional GAN.	6M	1	2
Q.2(A)	(i) Discuss prompt engineering and explain reusable prompting frameworks.	6M	2	3
	(ii) Compare zero-shot, one-shot, and few-shot learning in LLMs.	6M	2	4
	OR			
Q.2(B)	Write a short note on the following:			
	(i) GPT models.	6M	2	3
	(ii) Prompt Engineering.	6M	2	3
Q.3(A)	(i)Explain step-by-step how to build a chatbot using OpenAI.	6M	3	3
	(ii) Describe the basic steps of text generation using OpenAI.	6M	3	2
	OR			
Q.3(B)	Discuss about Utilizing of OpenAI APIs.	12M	3	4
Q.4(A)	(i) Write short notes on Gemini API authentication.	6M	4	2
	(ii) Define LLaMA and mention its Features.	6M	4	2
	OR			
Q.4(B)	Compare and contrast the Google Gemini and LLaMA in detail.	12M	4	4
Q.5(A)	Describe the role of Generative AI in automating text, image, and video content creation for a digital media company with examples.	12M	5	3
	OR			
Q.5(B)	Creating a project with hugging face for Business report generators.	12M	5	4

***** END*****

Hall Ticket No: | | | | | | | | | | |

Question Paper Code: 24MCAP406

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(UGC-AUTONOMOUS)

MCA II Year I Semester (R24) Regular End Semester Examinations, January - 2026

PENETRATION TESTING

Time: 3Hrs **Max Marks: 60**

Attempt all the questions. All parts of the question must be answered in one place only.
In Q.No 1 to 5 answer either A or B only

Q.No	Question	Marks	CO	BL
Q.1(A)	(i) Explain in brief, the various stages involved in penetration testing.	6M	1	2
	(ii) Discuss the planning and scoping of penetration testing.	6M	1	2
	OR			
Q.1(B)	Expand and explain NIST.	12M	1	2
Q.2(A)	(i) Classify the following phishing examples and justify your answer A text from "your bank" asking you to click a link to verify an unauthorized transaction. A message from a "delivery service" claiming a package is on hold and requires a fee or your information to proceed. A warning from "tech support" about a virus on your device, with a number to call that leads to fraudulent technicians.	6M	2	4
	(ii) Discuss the various types of USB attacks	6M	2	2
	OR			
Q.2(B)	Discuss the following with proper examples:			
	(i) Spear phishing	6M	2	2
	(ii) Watering hole attack	6M	2	2
Q.3(A)	(i) Write down the common network-based vulnerabilities.	6M	3	2
	(ii) What is DNS cache poisoning? Discuss with examples.	6M	3	2
	OR			
Q.3(B)	(i) What is Boolean-based SQL injection? Explain with examples.	6M	3	2
	(ii) How does session hijacking work? Discuss with examples.	6M	3	2
Q.4(A)	Explain the core phases and techniques involve in post-exploitation.	12M	4	2
	OR			
Q.4(B)	(i) What are C2 utilities? Discuss with examples	6M	4	2
	(ii) Describe the key post-exploitation scanning activities	6M	4	2
Q.5(A)	(i) What are the technical controls in pen testing? Describe	6M	5	2
	(ii) List out the important communication triggers.	6M	5	2
	OR			
Q.5(B)	Describe about the common root causes of vulnerabilities.	12M	5	3

***** END*****

Hall Ticket No: | | | | | | | | | | |

Question Paper Code: 24MCAP407

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(UGC-AUTONOMOUS)

MCA II Year I Semester (R24) Regular End Semester Examinations, January - 2026

FOG COMPUTING

Time: 3Hrs **Max Marks: 60**

Attempt all the questions. All parts of the question must be answered in one place only.
In Q.No 1 to 5 answer either A or B only

Q.No	Question	Marks	CO	BL
Q.1(A)	Describe the evolution of Fog Computing. What technological needs led to its development?	12M	1	2
	OR			
Q.1(B)	What are the key characteristics of Fog Computing? Explain the importance of proximity, low latency, and geographic distribution in its architecture.	12M	1	4
Q.2(A)	What is the OpenFog Consortium, and what are its primary objectives in Fog Computing?	12M	2	2
	OR			
Q.2(B)	Describe the OpenFog architecture and its key components. How does it address security and scalability?	12M	2	2
Q.3(A)	What are the benefits of processing health data locally instead of sending it to the cloud	12M	3	2
	OR			
Q.3(B)	How does fog computing enhance traffic management systems	12M	3	3
Q.4(A)	How does authentication help secure fog computing environments.	12M	4	2
	OR			
Q.4(B)	Analyze how different encryption algorithms affect fog node performance.	12M	4	4
Q.5(A)	Explain how combining 5G and fog computing enables ultra-low-latency applications.	12M	5	4
	OR			
Q.5(B)	How can AI/ML techniques optimize resource allocation in fog computing environments.	12M	5	3

***** END*****