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Mid Term Examinations - October 2026

Date: 07/10/2026 **Time:** 09:30 AM - 11:00 AM

Course Code: AIE5001 **Course Name:** Artificial Intelligence and Machine Learning for Auto IT

Semester: Third Semester **Max. Marks:** 50 **Weightage:** 50%

CO - Levels	CO1	CO2	CO3
Marks	10	34	46

PART A: Answer Following Questions. 10 M

Q.N.	Questions	M	CO	BT
1	Explain the role of CNNs in automotive computer vision.	2	CO2	BT2
2	Demonstrate how a specific computer vision technique can be used by a vehicle camera system to locate each pedestrian and vehicle, and justify your choice.	2	CO2	BT3
3	During autonomous driving, an object is detected by both camera and LiDAR. Explain how multi-sensor fusion can improve the confidence of the object detection.	2	CO3	BT2
4	Demonstrate how a vehicle's downstream autonomous driving stages utilize a detected pedestrian's localized coordinates to avoid a collision.	2	CO3	BT3
5	Apply AI techniques to the collected data from cameras, radar, GPS/IMU, and vehicle sensors to demonstrate how intelligent mobility is improved.	2	CO3	BT3

PART B : Answer Any 1 Following Questions. 10 M

Q.N.	Questions	M	CO	BT
6	Explain the fundamentals of Convolutional Neural Networks (CNNs). Discuss convolution, filters/kernels, feature maps, activation functions, pooling, and fully connected layers in the context of automotive computer vision	10	CO2	BT2
7	Apply a conceptual YOLO-based vehicle and pedestrian detection system for an autonomous vehicle. Explain the input data, preprocessing, YOLO inference, bounding boxes, confidence scores, Non-Maximum Suppression (NMS), and final detections.	10	CO2	BT2

PART C: Answer Any 1 Following Questions. 10 M

Q.N.	Questions	M	CO	BT
8	Develop a conceptual lane-detection pipeline for an ADAS system. Explain how camera images can be processed to identify lane markings and how the detected lanes can be used for lane-departure warning.	10	CO1	BT2
9	An object-detection model is evaluated using Precision, Recall, IoU, F1-score, and mAP. Explain how these metrics can be applied to evaluate a YOLO-based automotive object-detection system and interpret the results.	10	CO2	BT2

PART D: Answer Any 1 Following Questions. 10 M

Q.N.	Questions	M	CO	BT

PTO (Please Turn Over)

10	An autonomous vehicle must travel from Point A to Point B in an urban environment containing static and moving obstacles. Apply path-planning concepts to describe how a safe and feasible path can be generated and continuously updated.	10	CO3	BT3
11	Apply the autonomous driving stack to the following situation: a pedestrian suddenly enters the vehicle's lane. Explain how information flows through sensing, perception, localization, prediction, planning, and control before the vehicle responds.	10	CO3	BT3

PART E: Answer Any 1 Following Questions. 10 M				
Q.N.	**Questions**	**M**	**CO**	**BT**
12	A vehicle has inaccurate localization but reliable object detection. Apply multi-sensor fusion concepts to explain how GPS, IMU, LiDAR, camera, and radar information can collectively improve the vehicle's understanding of its environment and position.	10	CO3	BT3
13	Apply AI for intelligent mobility to design a conceptual system for reducing traffic congestion in a smart city. Identify the required sensor/data sources, AI processing stages, decision-making mechanisms, and expected mobility improvements.	10	CO3	BT3