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NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA
(An Autonomous Institute Affiliated to AKTU, Lucknow)

B.Tech

SEM: V - THEORY EXAMINATION (2025 - 2026)

Subject: Automotive Engineering

Time: 3 Hours

Max. Marks: 100

General Instructions:

IMP: Verify that you have received the question paper with the correct course, code, branch etc.

1. This Question paper comprises of **three Sections -A, B, & C**. It consists of Multiple Choice Questions (MCQ's) & Subjective type questions.

2. Maximum marks for each question are indicated on right -hand side of each question.

3. Illustrate your answers with neat sketches wherever necessary.

4. Assume suitable data if necessary.

5. Preferably, write the answers in sequential order.

6. No sheet should be left blank. Any written material after a blank sheet will not be evaluated/checked.

SECTION-A

20

1. Attempt all parts:-

- 1-a. In an EV, the drivetrain eliminates which component? (CO1,K1) 1
- (a) Differential
 - (b) Clutch and multi-gear transmission
 - (c) Motor
 - (d) Axle
- 1-b. A regenerative braking system requires: (CO1,K1) 1
- (a) Bidirectional energy flow between motor and battery
 - (b) One-way rectifier
 - (c) Mechanical brake only
 - (d) Air compressor
- 1-c. The friction lining in a clutch is usually made of: (CO2,K1) 1
- (a) Steel
 - (b) Cast iron
 - (c) Asbestos-based or ceramic material
 - (d) Aluminum
- 1-d. The main purpose of a gearbox is to: (CO2,K1) 1
- (a) Increase speed only
 - (b) Change torque and speed ratio
 - (c) Supply lubrication
 - (d) Connect engine and clutch
- 1-e. The internal combustion engine produces power by burning fuel: (CO3,K1) 1

- (a) Outside the engine cylinder
 (b) Inside the engine cylinder
 (c) In a separate boiler
 (d) None of these
- 1-f. A compression ignition (CI) engine uses: (CO3,K1) 1
 (a) Petrol
 (b) Diesel
 (c) LPG
 (d) Alcohol
- 1-g. The primary function of a clutch is to: (CO4,K1) 1
 (a) Connect and disconnect power between engine and gearbox
 (b) Control steering
 (c) Increase engine torque
 (d) Control fuel flow
- 1-h. Which of the following is not a type of clutch? (CO4,K1) 1
 (a) Single plate
 (b) Multi-plate
 (c) Torque converter
 (d) Diaphragm
- 1-i. In most RWD vehicles, the final drive is located at: (CO5,K1) 1
 (a) Front axle
 (b) Rear axle
 (c) Middle shaft
 (d) Gearbox
- 1-j. All-Wheel Drive (AWD) systems are designed to: (CO5,K1) 1
 (a) Drive only front wheels
 (b) Drive all wheels automatically as required
 (c) Save fuel
 (d) Improve steering
2. Attempt all parts:-
- 2.a. Differentiate between passenger and commercial vehicles. Explain the role of electric vehicles in sustainable transportation. (CO1,K2) 2
- 2.b. Differentiate between air-cooled and water-cooled engines.(CO2,K2) 2
- 2.c. State two advantages of electric vehicles over IC engine vehicles. (CO3,K2) 2
- 2.d. Explain the working of a single plate clutch. (CO4,K2) 2
- 2.e. What is an Electronic Control Unit (ECU)? (CO5,K2) 2

SECTION-B

30

3. Attempt all parts:-

3.a. Answer any one of the following:-

- 3.a.(i) Explain the classification of automobiles based on fuel type with examples. (CO1, 6

	K3)	
3.a.(ii)	Describe the advantages and disadvantages of front-engine layout. Discuss the rear-engine configuration with suitable examples. (CO2,K2)	6
3.b.	Answer any one of the following:-	
3.b.(i)	Explain the working principle of a spark ignition (SI) engine.(CO2, K3)	6
3.b.(ii)	Explain the working principle of a compression ignition (CI) engine. (CO2,K2)	6
3.c.	Answer any one of the following:-	
3.c.(i)	Discuss the advantages of electric mobility over conventional vehicles. (CO3,K3)	6
3.c.(ii)	Describe the classification of electric vehicles with examples (BEV, HEV, PHEV, FCV). (CO3,K3)	6
3.d.	Answer any one of the following:-	
3.d.(i)	Compare single plate and multi-plate clutches. (CO4,K3)	6
3.d.(ii)	Describe constant mesh gearbox and its advantages. (CO4,K3)	6
3.e.	Answer any one of the following:-	
3.e.(i)	Describe the function of sensors in monitoring vehicle systems.(CO5,K3)	6
3.e.(ii)	Explain On-Board Diagnostics (OBD) and its benefits.(CO5,K2)	6
<u>SECTION-C</u>		50
4.	Answer any <u>one</u> of the following:-	
4-a.	Explain in detail the classification of automobiles based on purpose, giving suitable examples. (CO1,K2)	10
4-b.	Discuss the vehicle classifications based on drive type (FWD, RWD, AWD/4WD) with advantages and limitations. (CO1,K3)	10
5.	Answer any <u>one</u> of the following:-	
5-a.	Explain the working of a spark ignition (SI) engine with a neat sketch. (CO2,K3)	10
5-b.	Explain the working of a compression ignition (CI) engine with a diagram. (CO2,K3)	10
6.	Answer any <u>one</u> of the following:-	
6-a.	Explain in detail the basic components of an electric vehicle and their functions. (CO3,K3)	10
6-b.	Discuss battery technologies used in EVs: Lead-acid, NiMH, and Lithium-ion. (CO3,K3)	10
7.	Answer any <u>one</u> of the following:-	
7-a.	Explain the importance of clutch system in vehicle performance and driver comfort. (CO4,K3)	10
7-b.	Discuss the advantages and disadvantages of different drive configurations. (CO4,K3)	10
8.	Answer any <u>one</u> of the following:-	
8-a.	Define Advanced Driver Assistance Systems (ADAS) and explain its significance. (CO5,K3)	10
8-b.	Explain Forward Collision Warning (FCW) and its impact on vehicle safety. (CO5,K3)	10