Name: **Enrolment No:**	

UPES

End Semester Examination, May 2024

Course: Introduction to Automotive Technology — **Semester : VI**

Program: B. Tech- Automotive Design Engineering — **Time : 03 hrs.**

Course Code: MECH3044 — **Max. Marks: 100**

Instructions: Use standard notations for explanation.

SECTION A
(5Qx4M=20Marks)

S. No.		Marks	CO
Q 1	Explain the Exhaust Gas Recirculation (EGR) system for emission control.	**4**	**CO3**
Q 2	List the advantages and limitations of nonmetallic materials in automotive environments.	**4**	**CO1**
Q 3	Discuss weight distribution in automotive and why is it important?	**4**	**CO1**
Q 4	Explain the purpose of a Charcoal Canister in controlling evaporative emissions from vehicles?	**4**	**CO3**
Q 5	Discuss the advantage of using electric motor over an engine during startup and acceleration mode.	**4**	**CO2**
SECTION B **(4Qx10M= 40 Marks)**			
Q 6	Elaborate on different circuit types employed in EGR systems, and how do they operate?	**10**	**CO3**
Q 7	Discuss the architecture of series hybrid electric vehicle and its working principle.	**10**	**CO2**
Q 8	Discuss application of lightweight automotive materials like magnesium alloys, aluminum alloys, advanced high-strength steels, and carbon fiber composites.	**10**	**CO1**

Q 9	Explain the concept of Partial Charge Compression Ignition (PCCI) and its role in improving fuel efficiency and reducing emissions in internal combustion engines. **OR** Discuss the main advantages and disadvantages of using gasoline direct injection (GDI) compared to traditional port fuel injection systems?	**10**	**CO4**
SECTION-C (2Qx20M=40 Marks)			
Q 10	Explain the term "Hybrid Vehicles", based on different parameters classify the hybrid vehicles.	**20**	**CO2**
Q 11	Elaborate on the main challenges associated with implementing Spark Assisted Compression Ignition (SACI) technology, and how does it combine elements of both spark ignition and compression ignition? Discuss the combustion phenomenon in SACI engine in detail. **OR** Explain the 'Degree of hybridization' in a hybrid vehicle for combustion power and the electric power utilization. Compare the 'Full HEV' with other configurations for various drive modes operations.	**20**	**CO4**