Graphic Era
HILL UNIVERSITY
Established by an Act of the State Legislature of Uttarakhand (Adhiniyam Sankhya 12 of 2011)
University under section 2(f) of UGC Act, 1956

End Term (Odd) Semester Examination November 2025

Roll no.....

Name of the Course and semester: B.Tech Mechanical 7th Sem
Name of the Paper: Automobile Engineering
Paper Code: TME 707

Time: 3 hour Maximum Marks: 100

Note:

(i) All the questions are compulsory.
(ii) Answer any two sub questions from a, b and c in each main question.
(iii) Total marks for each question is 20 (twenty).
(iv) Each sub-question carries 10 marks.

Q1. (2X10=20 Marks)

a. Define an automobile. Classify automobiles based on various parameters and provide appropriate examples.

.....CO1

b. Explain air resistance, rolling resistance, gradient resistance, and the effects of rolling, pitching, and yawing moments with diagrams.

.....CO1

c. Define the following I.C. engine terms: Bore, Stroke, Top Dead Centre (TDC), Bottom Dead Centre (BDC), Clearance Volume, Swept Volume, and Compression Ratio.

.....CO1

Q2. (2X10=20 Marks)

a. Differentiate between Single Point Fuel Injection (SPFI) and Multi Point Fuel Injection (MPFI) systems. Discuss their advantages and disadvantages with suitable examples.

.....CO2

b. Describe the working principle of an Electronically Controlled Diesel Injection System (ECDIS) with the help of a clear block diagram.

.....CO2

c. What is Variable Valve Timing (VVT)? Explain how it helps in improving engine performance, efficiency, and emission control.

.....CO2

Q3. (2X10=20 Marks)

a. Identify the main components of a vehicle transmission system. Present a schematic diagram and explain the function of each component.

.....CO3

b. Compare and contrast manual, automatic, and semi-automatic transmission systems.

.....CO3

c. Explain the working and purpose of a torque converter used in automatic transmissions.

.....CO3

Q4. (2X10=20 Marks)

a. State the main requirements of an automobile steering system. Describe the steering mechanism and its key elements with a neat schematic diagram.

.....CO4

b. Explain the construction and working of an Anti-lock Braking System (ABS). List its major components and state how it is superior to a conventional braking system.

.....CO4

c. Compare Independent, Rigid (Leaf Spring), Multi-Link, and Air Suspension Systems with neat sketches and mention their typical applications.

.....CO5

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Q5. (2X10=20 Marks)

a. Discuss the advantages and limitations of using CNG and LPG as automobile fuels.

.....CO6

b. Discuss the major advantages and drawbacks of using hydrogen as an automobile fuel. Briefly explain its production methods.

.....CO6

c. Explain the benefits and challenges associated with using biodiesel blends such as B20 in conventional diesel engines.

.....CO6