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 (Even) Semester Examination May-June 2025

Roll no.............................

Name of the Program and semester: B.Tech. (ECE) VI semester
Name of the Course: *Electric Vehicle Technology*
Course Code: **TOE 602**

Maximum Marks: 100

Time: 3 Hour

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.

CO 1 (2X10=20 Marks)

Q1.
a) Describe the methodology for defining the component sizing of an electric vehicle.
b) Describe the basic structure of an electric vehicle. Explain the differences between a conventional IC engine vehicle and an electric vehicle in terms of architecture and energy flow.
c) Describe the impact of vehicle dynamics on EV performance and how simulations help optimize these dynamics.

CO 2 (2X10=20 Marks)

Q2.
a) Explain the importance of a Battery Management System (BMS), including its hardware and software components.
b) What are the limitations of electric vehicles when compared to petrol and diesel vehicles?
c) Differentiate between a lithium battery and a regular battery.

CO 3 (2X10=20 Marks)

Q3.
a) Outline the architecture and working of an on-board charger in an Electric Vehicle.
b) Explain the differences between AC and DC charging methods, including their advantages and limitations.
c) Discuss the concept of wireless charging for EVs and its potential benefits and challenges.
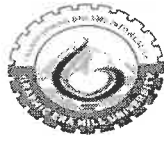
CO 4 (2X10=20 Marks)

Q4.
a) Define the SAE levels of automation and explain their relevance to autonomous vehicle development.
b) Describe the function and working of Forward Collision Warning (FCW) and Blind Spot Detection systems in ADAS.
c) Explain the importance of integration and system testing in the development of ADAS software.

CO 5 (2X10=20 Marks)

Q5.
a) Describe the basic transmission and receiver systems used in automotive wireless communication. What challenges arise due to radio transmission in vehicular environments?

End Term (Even) Semester Examination May-June 2025

b) Illustrate the integration of IoT and wireless networking in achieving vehicle autonomy.
c) What are the major wireless communication standards for autonomous vehicle applications?