# PRESIDENCY UNIVERSITY
## BENGALURU

## SCHOOL OF ENGINEERING
### MID TERM EXAMINATION - NOV 2023

**Semester :** Semester VII - 2020  
**Course Code :** EEE3049  
**Course Name :** Sem VII - EEE3049 - Automotive Safety Systems  
**Program :** B. TECH

**Date :** 3-NOV-2023  
**Time :** 9:30AM - 11:00AM  
**Max Marks :** 60  
**Weightage :** 30%

**Instructions:**  
*(i) Read all questions carefully and answer accordingly.*  
*(ii) Question paper consists of 3 parts.*  
*(iii) Scientific and non-programmable calculator are permitted.*  
*(iv) Do not write any information on the question paper other than Roll Number.*

## PART A

### ANSWER ALL THE QUESTIONS                    (5 X 2 = 10M)

1. TATA motors are maufacturing various type of cars, sedan, Hatch back and SUVs in Indian market. Mentions the primary goal of designing a vehicle's body for safety?

(CO1) [Knowledge]

2. The first generation Ford Cars have used the head light as shown in Fig.1. Mention the function of reflector in head light.



Fig. 1. Head light of First generation Ford figo

(CO1) [Knowledge]

3. Two hatch back cars are travelling at 70kmph and 80kmph respectively and collided with each other. Suggest the suitable equation to understand the energy and force experinced during the collision.

(CO1) [Knowledge]

4. All the Vehicles manufactured in the country have to comply with relevant **Indian Standards (IS) and Automotive Industry standards (AIS), suggest advanced active safety systems equipped in modern cars.**

(CO2) [Knowledge]

5. In modern day cars, adaptive lighting sytems are equiped in the car as a part of advanced active safety sytems. Mention the advantage of the systems.

<div align="right">(CO2) [Knowledge]</div>

## PART B

**ANSWER ALL THE QUESTIONS**            **(2 X 15 = 30M)**

6. A car with a mass of 1,000 kg is involved in a collision with a stationary object at a speed of 40 mph with typical stop time of vehicle is 0.2 second has experineced a force of 50 times the weight of the vehicle. The car is rated by a global NCAP of 5 Star. Analyse the impact on passenger and the compute deceleration experienced by the car.

<div align="right">(CO1) [Comprehension]</div>

7. Car A with a kerb weight of 1000kg has accelerated from 0kmph to 20kmph in 10 sec and the Car B with same keb weight has accelerated from 20kmph to 40kmph in 8 sec. The change in speed in both cases are 20kmph only. Assume both the cars collided with a stationary object, analyse the impact and comment on energy asscocited in both the cars. Mention the reasons for the same.

<div align="right">(CO1) [Comprehension]</div>

## PART C

**ANSWER THE FOLLOWING QUESTION**            **(1 X 20 = 20M)**

8. Tata Motors Sets New Benchmarks for Automobile Safety in India and has taken all possible measures to equip safety features in car models like **Altroz, Punch, Tiago, Tigor, and Tigor EV, accredited with GNCAP ratings of 4 and 5 stars too. As an engineers, list out the passive safety systems in above mentioned cars and describe the features in detail.**

<div align="right">(CO2) [Application]</div>