

PARUL UNIVERSITY
FACULTY OF ENGINEERING & TECHNOLOGY
M.Tech. Winter 2018-19 Examination

Semester: 1
Subject Code: 203206133
Subject Name: Automotive Aerodynamics & Safety

Date: 13/12/2018
Time: 10:30 am to 1:00 pm
Total Marks: 60

Instructions:

1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.

- Q.1** A) Why aerodynamic analysis is required in automotive vehicle? (05)
B) Define: path line, streak line and stream line. (05)
C) What are the different methods used for drag reduction? Discuss the use of spoilers. (05)

- Q.2 Answer the following questions.** (Attempt any three) (Each five mark) (15)
A) What do you mean by flow separation? How it will affect the performance of a vehicle?
B) What is wind tunnel testing? How drag is measured with the help of wind tunnel?
C) Describe the working of Anti Lock Braking System.
D) How airbag is useful for interior safety of automotive vehicles?

- Q.3** A) What are the aerodynamic forces and moments? Derive equations for lift and drag with a suitable diagram. (07)
B) Explain wake effect and dust flow pattern at the rear side of the vehicle. (08)

OR

- B) Explain bumper design for vehicle safety. (08)

- Q.4** A) Explain the causes of rear end collision. How it can be reduced? (07)

OR

- A) How collapsible steering column works. Give detail insights of it. (07)
B) Differentiate between active and passive safety. Explain various parameters to be considered for designing a passenger vehicle for safety. (08)