

Time: (3HRS)

[TOTAL MARKS: 80]

N.B:-

- 1) Question no 1 is compulsory
- 2) Attempt any three out of remaining six questions
- 3) Assume any suitable data wherever required but justify the same
- 4) Illustrate answers with neat sketches wherever required
- 5) Answers to questions should be grouped and written together

Q1. Attempt any four questions out of six.

- i. What is friction drag? What is its percentage contribution to aerodynamic drag?
- ii. What is an SSS panel? Draw neat sketches illustrating examples of SSS and Non – SSS panels.
- iii. List all parameters included in a package of a vehicle.
- iv. Which forces are responsible for pitching and rolling moment? Explain with the help of an equation.
- v. Draw diagram of power limited acceleration and label all parameters explaining its working.
- vi. Explain the term vortices and its influence on aerodynamic.

Q2.a) Explain with neat diagram vertical symmetric loading showing all calculations for reactions on front and rear axle. (10)

b) What is vehicle drag? Explain different aerodynamic forces and moments with their effect on vehicle. (10)

Q3.a) Explain Thin walled structures. With the help of diagram give example of closed and open thin walled structures and explain their behavior in torsion. (10)

b) What is Ergonomics? Write design considerations of driver's seat and explain different types of driver seats labeling all parameters and values based on its type. (10)

Q4.a) Explain in detail following layout of structures with diagram for edge forces distribution in torsion and bending. (10)

(i) Integral (ii) Open Integral (iii) Flat or Punt type. (10)

b) Explain layout of Design and Preliminary design in detail.

Q5.a) With neat sketch explain visibility and blind area of passenger car (10)

b) Write short notes on following: (10)

(i) Master Model

(ii) Nomogram

