

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech.(AE) (2011 Onwards) (Sem.-6)**AUTOMOTIVE AERODYNAMICS**

Subject Code : BTAE-604

Paper ID : [A2383]

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTION TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A**1. Answer briefly :**

- (a) Name the parameters on which aerodynamic drag of a vehicle depends.
- (b) Differentiate between laminar and turbulent boundary layer.
- (c) What are the various forces and moments acting on a vehicle in motion?
- (d) What do you mean by specific fuel consumption of a vehicle?
- (e) What are the methods used to decrease drag of a car?
- (f) What are various types of equipments and transducers used for measurements in vehicle wind tunnel?
- (g) What is aerodynamics?
- (h) Define bluff body.
- (i) What do you understand by shape optimization?
- (j) Explain the principle of wind tunnel.

SECTION-B

2. Discuss the effects of aerodynamic pitching moment on the vehicle characteristics.
3. How front end modifications help in the performance of a car? Discuss.
4. Discuss the effect of aerodynamic forces on lateral deviation of a vehicle and also describe the equation for evaluation of the influence of side force, weight and aerodynamic lever arm length.
5. Describe the effects of natural wind, wind forces due to steady side winds on aerodynamic stability of a vehicle.
6. Discuss the concept of hatch back, fast back and square back for shape optimization of cars.

SECTION-C

7. With the help of neat diagram, describe the phenomena of laminar and turbulent boundary layer, their separation and friction drag on a body in two-dimensional flow.
8. With the help of a neat diagram. Explain the procedure to measure aerodynamic forces and moments by wind tunnel balances.
9. Explain the performance of a vehicle in terms of motive force diagram, acceleration time and elasticity and specific fuel consumption.