

Sub. Name: Wind Tunnel Techniques

Sub. Code: AE 2353

Duration: 180 minutes

Date: 08/04/2016

Branch: Aeronautical

Max.Marks: 100

PART-A (10 x 2 =20)

1. Distinguish between open circuit and closed circuit wind tunnel
2. What is dimensional homogeneity
3. What are the difficulties associated with testing of models at transonic condition
4. WHAT are the major disadvantages of blow down tunnel
5. Classify wind tunnel balances
6. Name the various instruments used to calculate the test section air speed
7. What is the fundamental principle of interferometer
8. Define Strouhal number and state its importance
9. Write down the principle of laser Doppler anemometry
10. Write the difference between non intrusive and intrusive flow diagnostic technique

PART-B (5 x 16 =80)

1. The variable controlling the motion of a floating vessel through water are the drag force F , the speed V , the length L , the density ρ , and dynamics viscosity μ of water and acceleration due to gravity g . Derive an expression for F by dimensional analysis.

(Or)

Explain the construction and working of suction type open circuit wind tunnel with neat sketch

2. (i) Explain the special problems in testing of models in transonic wind tunnel.
(ii) Explain the operation of blow down supersonic wind tunnel with neat sketches.

(or)

Explain in detail about instrumentation and calibration of wind tunnel.

3. With a neat sketch explain the construction and working of six component wind tunnel balance.

(or)

How the velocity calibration is carried out in low speed wind tunnel. Explain with neat sketch working of constant temperature hot wire anemometer.

4. With neat illustration explain the basic principles of schelieren method of flow visualisation. What are the advantages and limitations of this method?

(or)

(i) Explain shadowgraph technique with neat diagrams.

(ii) Explain Mach Zender interferometer flow visualisation technique with neat sketches.

5. Derive the basic governing equations for laser Doppler anemometry and explain its working principle.

(or)

Explain the principle of particle image velocimetry (PIV)? What are its advantages?