18E104

B. Tech. EXAMINATION, 2020

(Fifth Semester)

(C Scheme) (Main Only)

AERONAUTICAL ENGINEERING

AER307C

Compressible and Finite Wing Aerodynamics

AER

Time : 2½ Hours]   [*Maximum Marks :* 75

Before answering the question-paper candidates should ensure that they have been supplied to correct and complete question-paper. No complaint, in this regard, will be entertained after the examination.

Note : Attempt *Four* questions in all. All questions carry equal marks.

1. (a) Explain Complex potential function.

   (b) Explain Helmholtz's theorem.

   (c) Define winglets.

   (d) Explain Drag reduction by variable twist.

   (e) Explain variable camber wings.

2. Transforms a circle into airfoils by using Kutta-Zhukovsky transformation.

3. Explain velocity and pressure distribution on Zhukovsky airfoil section.

4. Describe the symmetrical airfoils, cambered airfoil and flapped airfoil.

5. Explain Elliptic and general lift distribution over finite unswept wings and effect of aspect ratio.

6. Explain the Polhamus theory and leading edge suction analogy used in Delta Wing Aerodynamics.

7. Derive Temperature and Pressure ratios as a function of Mach No. in the Compressible flow.

8. Explain the Subsonic, Transonic wind tunnels with neat sketch.

9. Explain Hot wire Anemometer in the Experimental Method.