

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER-V (NEW) EXAMINATION – WINTER 2020

Subject Code:3150107

Date:01/02/2021

Subject Name:Aerodynamics

Time:10:30 AM TO 12:30 PM

Total Marks: 56

Instructions:

1. Attempt any FOUR questions out of EIGHT questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

Marks

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|------------|---|-----------|
| Q.1 | (a) What is the application of wind tunnel? | 03 |
| | (b) Write a short note on Flow separation. | 04 |
| | (c) Explain kelvin's Circulation Theorem and starting vortex. | 07 |
| Q.2 | (a) Explain Briefly airfoil and types of airfoil. | 03 |
| | (b) Write a short note on NACA Series Airfoil. | 04 |
| | (c) Explain Classical Thin Airfoil Theory | 07 |
| Q.3 | (a) What is bound vortex and Horse shoe vortex? | 03 |
| | (b) Write Kutta Condition and explain with sketch | 04 |
| | (c) Explain The flow over an Airfoil case. | 07 |
| Q.4 | (a) Explain Helmholtz's theorem | 03 |
| | (b) What is the meaning of Compressible flow? | 04 |
| | (c) Explain Prandtl-Meyer relation in flow with normal shock waves | 07 |
| Q.5 | (a) What are the applications of Airfoil? | 03 |
| | (b) Write a short note on Delta Wing. | 04 |
| | (c) Explain Speed of sound with derivation | 07 |
| Q.6 | (a) Explain Expansion of supersonic flow | 03 |
| | (b) Derive fundamentals relations of oblique shock | 04 |
| | (c) Explain The Vortex lattice Numerical method. | 07 |
| Q.7 | (a) Explain shock polar diagram. | 03 |
| | (b) Write a short note on Rarefaction wave | 04 |
| | (c) Derive Governing equation for inviscid compressible flow. | 07 |
| Q.8 | (a) Write a short note on Development of a shockwave | 03 |
| | (b) Derive Rankine-Hugoniot equation for flow with Oblique shock wave. | 04 |
| | (c) Explain airfoil stall theory and characteristic of airfoil with suitable diagram. | 07 |