Reg.No. \_\_\_\_\_\_\_\_\_\_\_\_



**UNIVERSITY**

(Karunya Institute of Technology & Sciences)

(Declared as Deemed-to-be University under Sec.3 of the UGC Act, 1956)

**End Semester Examination – April/May – 2017**

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| **Code** | **14AE2026** | **Duration :** | **3hrs** |
| **Sub. Name** | **WIND TUNNEL TECHNIQUES** | **Max. marks :** | **100** |

**ANSWER ALL QUESTIONS (5 x 20 = 100 Marks)**

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| Q. No. | Sub Div. | Questions | Course  Outcome | Marks |
| 1. | a. | The SATA stands for \_\_\_\_\_\_\_\_\_\_\_. | CO1 | 1 |
| b. | State the significance of CL. | CO1 | 2 |
| c. | Define the Reynolds Number, Mach Number. | CO1 | 2 |
| d. | Classify the special purpose tunnels and explain the Vertical type wind tunnel with neat sketch. List down the vertical tunnel location in India. | CO1 | 15 |
| (OR) | | | | |
| 2. | a. | Calculate the Reynolds number and Mach number of 50 cm cylinder kept at the test section of low speed wind tunnel.Assume test section velocity is 25m/s. | CO1 | 4 |
| b. | Elaborate the Types of Wind tunnels available in KARUNYA Aerospace laboratory with neat sketch and state its merits & demerits | CO1 | 16 |
| 3. | a. | What is Calibration and Why calibration is required for Supersonic Wind Tunnel? | CO1 | 5 |
|  | b. | Explain the Supersonic windtunnel for range of Mach 2-4.0 and state the Possible tests with this tunnel with neat sketch. | CO1 | 15 |
| (OR) | | | | |
| 4. | a. | Give the importance of Honeycomb screen in Subsonic Wind Tunnel. | CO1 | 5 |
|  | b. | Classify the mode of operation in shock tube and by using shock tube explain the various test possibilities for societial needs. | CO2 | 15 |
| 5. | a. | What is the need of Flow visualization in Low speed tunnel? | CO3 | 5 |
|  | b. | Explain the various flow visualization techniques and state its applications to supersonic flow. | CO3 | 15 |
| (OR) | | | | |
| 6. | a. | What you mean by shock speed? | CO3 | 2 |
|  | b. | Define Compressibilty. | CO3 | 3 |
|  | c. | Explain the Working Principle of Mach Zhender Interferometer with neat sketch. State its Demerits. | CO3 | 15 |
| 7. | a. | Dicuss the design procedures followed to design a subsonic wind tunnel. | CO2 | 10 |
|  | b. | What is wind tunnel model sizing? Explain the model sizing with neat figure. | CO2 | 10 |
| (OR) | | | | |
| 8. | a. | State the Bernoulli’s Prinicple.Classify the method of pressure measurement techniques followed in the Wind tunnel. | CO2 | 4 |
|  | b. | Elaborate the instruments used to measure the velocity and temperature in low speed tunnel with neat sketch. | CO2 | 16 |
|  | | **Compulsory**: |  |  |
| 9. | a. | Draw the force and Moment diagram of airfoil at zero angle of attack. | CO3 | 2 |
|  | b. | Define Center of Pressure and Aerodynamic Center. | CO3 | 3 |
|  | c. | By using six component balance, how do you measure different forces acting on climbing flight in tunnel? elaborate it with neat sketch. | CO3 | 15 |