

Register Number: .....

**B.E DEGREE EXAMINATIONS: APRIL/MAY 2014**

(Regulation 2009)

Seventh Semester

**AERONAUTICAL ENGINEERING**

AER135: Industrial And Experimental Aerodynamics

**Time: Three Hours**

**Maximum Marks: 100**

**Answer all the Questions:-**

**PART A (10 x 1 = 10 Marks)**

1. Betz coefficient value is
  - a) 0.48
  - b) 0.59
  - c) 0.69
  - d) 0.61
2. Base slant for automobile car as per vehicle aerodynamics
  - a) 11 to 21
  - b) 21 to 30
  - c) 12 to 18
  - d) 25 to 31
3. Galloping occurs
  - a) Tall buildings
  - b) Low rise buildings
  - c) Chimneys
  - d) All the above
4. In bridges
  - a) Galloping
  - b) Flutter
  - c) Induced vibration
  - d) All the above
5. Calibration is
  - a) Checking the instrument value with standard instrument
  - b) Correcting the instrument error value with standard instrument
  - c) Minimizing the instrument value with standard instrument
  - d) Optimizing the instrument value with standard instrument
6. Which balance is used to measure accurate force
  - a) Internal
  - b) External
  - c) Semi Internal
  - d) Semi External
7. Suggested blockage ratio for wind turbines in wind tunnel
  - a) 5%
  - b) 9%
  - c) 12%
  - d) 7%
8. Wake blocking is calculated for
  - a) Cylinder
  - b) Tall buildings

- c) Automobile vehicle
  - d) All the above
9. Trisonic tunnel is able to measure
  - a) Sonic
  - b) Subsonic
  - c) Supersonic
  - d) All the above
10. One of the following is associated with hypersonic tunnel
  - a) Moisture
  - b) Air heater
  - c) Mach number above 5
  - d) (a) and (b)

**PART B (10 x 2 = 20 Marks)**

11. Differentiate between horizontal and vertical axis machine.
12. What are the Drag reduction methods available for Automobile vehicle?
13. What are the special problems in tall building?
14. Define galloping.
15. What is meant by calibration?
16. Differentiate between internal and external balances.
17. Define blockage ratio.
18. What is meant by downwash correction?
19. Differentiate between rigid and flexible model.
20. List out the peculiarities in hypersonic tunnel.

**PART C (5 x 14 = 70 Marks)**

21. a) Derive Betz coefficient using momentum theory.  
**(OR)**  
b) Explain the power coefficients and drag coefficients variation in automobile vehicles.
22. a) Discuss in detail about building ventilation and architectural aerodynamics  
**(OR)**  
b) Explain about Vortex induced vibrations in chimneys.
23. a) Explain the working principle of six component balances in wind tunnel.  
**(OR)**  
b) How are wind tunnel tests performed for wind mill generator in wind tunnels?
24. a) Discuss about solid and wall blocking corrections for wind tunnel test

(OR)

b) Discuss about Scale effects on aerodynamic characteristics and stability derivatives.

25. a) Briefly discuss about Tare and interference evaluation

(OR)

b) What are the optical techniques used for flow visualization and explain any one with a neat sketch.

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