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**Question Paper Code : X10039**

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2021  
Sixth Semester  
Aeronautical Engineering  
AE 8602 – EXPERIMENTAL AERODYNAMICS  
(Regulations 2017)

Time : Three Hours

Maximum : 100 Marks

Answer ALL questions

PART – A

**(10×2=20 Marks)**

1. What are the properties of fluids that are important for fluid mechanics measurement ?
2. What is the performance terms associated with measurement systems ?
3. How turbulence is generated ?
4. What are the power losses in a wind tunnel ?
5. Name some flow visualization techniques.
6. Draw a fringe pattern of any specific sample size and loading.
7. What are the characteristics of Pitot-static tube ?
8. Write a note on non-intrusive methods of pressure and velocity.
9. How boundary layers are formed in a fluid flow ?
10. State Taylor-Proudman theorem.

PART – B

**(5×13=65 Marks)**

11. a) Explain the following :
  - i) Direct measurements. **(6)**
  - ii) Analogue methods. **(7)**

(OR)

  - a) Discuss about the following :
    - i) Components of measuring systems. **(6)**
    - ii) Flow visualization. **(7)**



12. a) Explain the characteristic features, operation and performance of a low speed wind tunnel.

(OR)

b) Describe the wind tunnel balance, wire balance and balance calibration.

13. a) With a schematic diagram, explain the principle and operation of a smoke tunnel.

(OR)

b) Explain the outcome achieved in Schlieren system and shadowgraph technique.

14. a) Explain constant current and constant temperature Hot-wire anemometer.

(OR)

b) Explain about pressure transducers and pressure measurement techniques.

15. a) Explain in detail about data acquisition and processing.

(OR)

b) Explain about the estimation of measurement errors and uses of uncertainty analysis.

PART – C

(1×15=15 Marks)

16. a) Develop a flow visualization technique to visualize high-speed flows in the ranges of transonic and supersonic Mach numbers and explain.

(OR)

b) Study the flow fields around hypercritical airfoils in the steady and unsteady transonic regimes of flow and explain.

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