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10AE831

**Eighth Semester B.E. Degree Examination, June/July 2018**  
**Flight Testing**

Time: 3 hrs.

Max. Marks:100

**Note: Answer any FIVE full questions, selecting at least TWO questions from each part.**

**PART – A**

- 1 a. Briefly discuss the purpose and scope of flight testing, and types of flight testing. (10 Marks)  
b. Explain the sources of errors in flight testing and the techniques for minimizing the errors. (10 Marks)
- 2 a. Describe a Sensing/ Transducing technique for measuring : i) Linear acceleration ii) Angular acceleration iii) Vibration iv) force v) temperature. (12 Marks)  
b. Describe the functioning of on board and ground-based data acquisition systems for flight testing. (08 Marks)
- 3 a. Explain the PIW – VIW theory for level flight performance of propeller driven aircraft. (10 Marks)  
b. Derive the Breguet range equation for a propeller driven aircraft. (10 Marks)
- 4 a. What is a drag polar? Mention the methods used for determining drag through flight testing. Explain any one method. (10 Marks)  
b. Explain the flight test methods used for take-off and landing performance evaluations. (10 Marks)

**PART – B**

- 5 a. Define neutral point, and describe the flight test methods for determining the stick-fixed and stick-free neutral points. (10 Marks)  
b. What is the importance of short-period mode for aircraft stability and control? Explain the flight test method and data reduction for evaluating the short –period modal parameters. (10 Marks)
- 6 a. Describe the spiral, roll and Dutch roll motions of aircraft with neat diagrams. (10 Marks)  
b. Explain the flight test method for evaluating the dynamic directional stability. (10 Marks)
- 7 a. Write brief notes on :  
i) Handling qualities and HQ levels  
ii) Flight phase categories,  
iii) Flight Envelopes. (06 Marks)  
b. Explain the Cooper–Harper pilot rating scale for handling qualities with the help of a neat flow chart. (14 Marks)
- 8 a. What is a spin shorthand? Describe the stone shorthand with neat sketches. (06 Marks)  
b. Explain spin build-up and recovery techniques, keeping the phases of spin in view. (08 Marks)  
c. Define the terms :  
i) flutter ii) vibration iii) buffeting in dive testing. (06 Marks)

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Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
2. Any revealing of identification number to another candidate will be treated as malpractice.