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

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**End Semester Examination – Nov / Dec – 2019**

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| **Code :** | **17AE2020** | **Duration :** | **3hrs** |
| **Sub. Name :** | **AIRCRAFT STABILITY AND CONTROL** | **Max. Marks :** | **100** |

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

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Q.**  **No.** | **Sub**  **Div.** | **Questions** | **Course**  **Outcome** | **Marks** |
| 1. |  | Derive the contribution of wing and tail pitching moment for airplane static longitudinal stability. | CO1 | 20 |
| **(OR)** | | | | |
| 2. | a. | Derive the neutral point equation for stick fixed condition for static longitudinal stability. | CO1 | 14 |
| b. | Explain briefly the jet power effect on longitudinal static stability in fighter airplane. | CO1 | 6 |
|  |  |  |  |  |
| 3. | a. | Explain the hinge moment parameters for stick fixed static longitudinal stability. | CO2 | 20 |
| **(OR)** | | | | |
| 4. | a. | Derive the neutral point equation for stick free longitudinal stability. | CO2 | 13 |
| b. | Write short notes on stick force gradients for an unaccelerated flight. | CO2 | 7 |
|  |  |  |  |  |
| 5. |  | Derive contribution of wing, fuselage and vertical tail for static Directional Stability. | CO3 | 20 |
| **(OR)** | | | | |
| 6. |  | Explain the following in detail: |  |  |
| a. | Adverse Yaw | CO3 | 7 |
| b. | Rudder lock | CO3 | 7 |
| c. | One engine inoperative conditions | CO3 | 6 |
|  |  |  |  |  |
| 7. |  | Elaborate the following: |  |  |
| a. | Dihedral Effect | CO4 | 8 |
| b. | Aileron reversal | CO4 | 8 |
| c. | Coupling between rolling and yawing moments | CO4 | 4 |
|  |  |  |  |  |
| **(OR)** | | | | |
| 8. |  | Evaluate the aileron power by using strip theory and explain the factors affecting aileron control power. | CO4 | 20 |
|  | | **Compulsory:** |  |  |
| 9. | a. | Explain the significance of Routh’s discriminant. | CO5 | 10 |
| b. | Write about auto rotation. | CO5 | 5 |
| c. | Discuss about spin recovery. | CO5 | 5 |