INSTITUTE OF AERONAUTICAL ENGINEERING
(Autonomous)
(Dundigal-500043, Hyderabad)

B.Tech VII SEMESTER END EXAMINATIONS (REGULAR) - FEBRUARY 2022
Regulation: R18
AUTOMATIC CONTROL OF AIRCRAFT

Time: 3 Hours   **(AE)**   **Max Marks: 70**

Answer FIVE Questions choosing ONE question from each module
(NOTE: Provision is given to answer TWO questions from any ONE module)
All Questions Carry Equal Marks
All parts of the question must be answered in one place only

MODULE – I

1. (a) Discuss about drone radio control system with neat diagram and operation range. **[7M]**

   (b) Explain the advance visual docking guidance system used for airplane and missiles. How these both differs from each other? **[7M]**

2. (a) Compare the merits and demerits of feedback control systems in comparison to open loop control. **[7M]**

   (b) Illustrate the aircraft homing system and discuss each element of the homing system with suitable operating principle. **[7M]**

MODULE – II

3. (a) Discuss application of feedback in stability augmentation system. Illustrate block diagram of Fuzzy control law for stability augmentation system. **[7M]**

   (b) Identify the ten components related to flight control system and explain three of them with their functions and principles. **[7M]**

4. (a) How control augmentation system eliminates the problems in stability augmentation system? Discuss with suitable examples. **[7M]**

   (b) Discuss wide area augmentation system (WAAS) for civilaviation navigation. What types of navigation this system does? **[7M]**

MODULE – III

5. (a) Explain about moment equation in an airplane. Write moment equations in all the three axes and explain each term and give some examples. **[7M]**

   (b) Describe the pitch orientation control system and acceleration control system of auto pilot with block diagram. **[7M]**

6. (a) Discuss in detail about flight path stabilization and longitudinal control law design using back stepping algorithm. **[7M]**

   (b) Develop the block diagram of the basic autopilot used for the analysis withrootlocus for inner loopsystem. **[7M]**

MODULE – IV

7. (a) Describe about yaw orientation control system with block diagram and explain each block element with its application and analyze its result. **[7M]**

   (b) Discuss about auto pilot modes. Name two modes and explain each with suitable diagram.
   [7M].

8. (a) Explain in detail about damping of the dutch roll of the aircraft during flight. How lateral autopilot is helpful to counter this effect? **[7M]**

   (b) What are the controls managed by single axis autopilot? "Auto pilot is every where" discuss about this statement. **[7M]**

MODULE – V

9. (a) Describe in detail about fly-by-wire flight control features and advantages. **[7M]**

   (b) Show with the block diagrams of the control laws and write its equation related to rudder, aileron and elevator deflection. **[7M]**

10. (a) Explain the methods for flight path angle rate command/ Hold algorithm. How this reduces the work load of the pilot? **[7M]**

    (b) Demonstrate the self-adaptive autopilot and the philosophy behind the controlling of the airplane giving suitable sketch with all elements. **[7M]**

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