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Question Paper Code : 40063

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2021.

Sixth Semester

Aeronautical Engineering

AE 8604 – AIRCRAFT DESIGN

(Regulations 2017)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What are all the key parameters involved in aircraft design?
2. Classify airplanes based on configuration.
3. What is meant by Wingload? What is its significance?
4. What do you understand TSFC as a function of BPR?
5. Differentiate flat rated and torque limited power plants.
6. List down the various power plants used in aircraft.
7. How do you calculate limit load factors?
8. Why T tail design is preferred for Cessna aircraft?
9. What are the loads acting on the landing gear?
10. Distinguish between static and dynamic stability.

PART B — (5 × 13 = 65 marks)

11. (a) Explain different phases involved in airplane design.

Or

- (b) Explain classification of airplanes based on its function and list down the factors affecting aircraft configuration.

12. (a) Justify the design of main wing of a typical aircraft based on type of wing aspect ratio, taper ratio and sweep angle.

Or

- (b) Explain wing loading effect on takeoff and landing.

13. (a) What are the different types of power plants? Explain how the location of power plants affects the design of aircrafts.

Or

- (b) Explain steps involved for designing a propeller propulsion system for a typical aircraft.

14. (a) Mention the different types of tail design. Explain in detail how the location and type of tail influences the performance and stability aspects of airplanes.

Or

- (b) (i) Explain the procedure involved in the design of load carrying members of aircraft wing and Fuselage. (9)

- (ii) Explain the significance of V-n diagram in airplanes. (4)

15. (a) Explain stability aspects on the design of control surface?

Or

- (b) Mention different types of landing gear arrangements? Explain anyone in detail?

PART C — (1 × 15 = 15 marks)

16. (a) List down the characteristics of an aircraft that affects its response to turbulent gust loads. What type of design would minimize this effect? Explain its influence on the different performance parameters such as Range, Maneuverability, take off and landing. (15)

Or

- (b) In the conceptual design phase involves step by step approach to determine the location of landing gears. Take a commercial aeroplane and detail the procedure involved with plan and side view of the aircraft. (15)