Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 20082

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2022.

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. List out the various types of aircraft based on the mission.
2. State the factors which determine the selection of power plant and its location for a military aircraft.
3. Briefly explain about Wing Dihedral and Anhedral. Write its importance.
4. Draw the location of the stall area of the straight and taper wing.
5. Justify the reasons for choosing a power plant for a low-speed low altitude aircraft.
6. What are the advantages of lower rear surface of the wing of the Airbus A340 exhibits a strong camber?
7. What is the total weight of an airplane if moving 227 kg of cargo 2.43 metres forward shifts the CG 0.0508metres?
8. What might have been the primary reason for changing the pylons?
9. Why does it make sense to deploy the slats during take-off?
10. What is the need for aerodynamic balancing?

PART B — (5 × 13 = 65 marks)

11. (a) Explain in detail the various types of aircraft configuration.

Or

(b) Discuss in detail account of unconventional configuration of aircraft design.

12. (a) Mention the different types of aircraft based on the wing position and wing geometry. State its merits and demerits.

Or

(b) Write in brief about the aerodynamic design aids and features that are incorporated onto modern wings i.e. Vortex generators, Spoilers & Air Brakes, Stall fences, Tip plates and winglets etc.

13. (a) Describe the procedure in details on estimation of loads on complete aircraft.

Or

(b) Discuss in detail about procedure for calculation of the Weight estimation of a four seater aircraft with suitable assumptions.

14. (a) Explain nomenclature of a propeller with a neat sketch.

Or

(b) What are the factors to be considered for obtaining maximum range for a turbojet airplane? Explain with proper reasoning.

15. (a) Explain in details about the structural components in an aircraft.

Or

(b) Describe in detail account of landing gear conventional layout.

PART C — (1 × 15 = 15 marks)

16. (a) Classify the types of aircraft based on the nature of power plant and its location, with schematic diagram. What are the factors to be considered for obtaining maximum range for a reciprocating or a propeller combination airplane?

Or

(b) Draw the conceptual sketch of a passenger aircraft carrying about 100 passengers and explain the components. How is the wing area calculated?