Reg. No. : ☐☐☐☐☐☐☐☐☐☐☐☐☐

Question Paper Code : 30012

B.E./B.Tech DEGREE EXAMINATIONS, APRIL/MAY 2023.

Third Semester

Aeronautical Engineering

AE 3301 — ELEMENTS OF AERONAUTICAL ENGINEERING

(Regulations 2021)

Time : Three hours   Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Name few advanced materials used for aircraft construction.

2. What are the advantages of biplanes over monoplanes?

3. Distinguish between conventional and powered flying control of aircraft

4. What is a Fuselage?

5. Define drag and name the different types of drag.

6. What are the significance of ISA?

7. What are the advantages of composite materials in aircraft industry?

8. Define Factor of Safety.

9. What is the function of compressor in a turbine engine?

10. What is the operating principle of rockets?

PART B — (5 × 13 = 65 marks)

11. (a) Explain the history of aviation and describe the evolution of present day advanced aircraft. (13)

Or

(b) Explain the advancements in aircraft propulsive system over the years. (13)

12. (a) Explain the different types of flight vehicles in detail. (13)

Or

(b) Name few important instruments used for flying and explain the operating principle of Altimeter and Air Speed Indicator with neat sketches. (13)

13. (a) With neat sketch explain about the physical properties and structure of the atmosphere. (13)

Or

(b) What does NACA stand for in airfoil? Classify airfoils and explain with examples. (13)

14. (a) With neat sketch explain a typical aircraft wing structure. (13)

Or

(b) Name the different materials used for aircraft construction and explain the advancements in metallic and non-metallic materials over the years. (13)

15. (a) Describe the working of turbo prop engine with neat sketch. (13)

Or

(b) Define the principle of operation of rockets and explain the working of Solid Propellant Rocket with neat sketch. (13)

PART C — (1 × 15 = 15 marks)

16. (a) Draw a general Stress–strain diagram for aluminium and steel and analyze how proportional limit, yield stress and ultimate tensile stress varies in both materials. (15)

Or

(b) Describe in detail about the structural design approaches and construction fuselage with respect to early airplane and modern airplanes. (15)

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2   30012