Reg. No. : | E | N | G | G | T | R | E | E | . | C | O | M |

Question Paper Code : 20026

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 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.   Write the principle of flying hot air balloon.

2.   Differentiate between biplane and monoplane.

3.   Define powered control system.

4.   Name basic flying instruments used for flying a trainer aircraft.

5.   What do you understand by transonic flow?

6.   What is ISA?

7.   Differentiate between monocoque and semi monocoque structure.

8.   Define factor of safety.

9.   Name the launch vehicles of ISRO.

10. Brief the principle of turboprop propulsion.

PART B — (5 × 13 = 65 marks)

11. (a)   Describe the contribution of Sir George Cayley to the field of aviation and aircraft designs of Leonard Da Vinci.

Or

   (b)   Explain recent developments in the area of aerodynamics and propulsion.

12. (a) Explain with neat sketch, the components of an aircraft and its functions.

Or

(b) Describe the detailed classification of the airplanes.

13. (a) With neat sketches, explain the forces and moments acting on an airplane.

Or

(b) (i) Explain Continuity equation and Bernoulli's equation for an incompressible flow. (6)

(ii) Explain how an airplane wing produces lift with neat diagram. (7)

14. (a) Explain the different types of fuselage construction in detail with sketches.

Or

(b) Explain in detail about the usage of different materials in aerospace industry.

15. (a) With a schematic diagram, explain the construction and operation of a turbojet engine.

Or

(b) With neat sketch, explain the operation of a liquid propellant rocket engine.

PART C — (1 × 15 = 15 marks)

16. (a) With a neat sketch, explain the nomenclature of an unsymmetrical airfoil and with an example.

Or

(b) Explain the typical aircraft control actuation by means of fly-by-wire system with a suitable diagram.

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