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

Question Paper Code : 70008

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2022.

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. Define Ornithopter.
2. Write any two differences between biplane and monoplane.
3. List the systems for control actuation.
4. What are the components of an airplane?
5. State Newton's second law of motion.
6. Bring out the values for standard atmospheric pressure density, and temperature.
7. State Hooke's Law.
8. Sketch the stress-strain diagram.
9. How propellers are helpful in thrust production?
10. Mention the types of rockets.

PART B — (5 × 13 = 65 marks)

11. (a) Explain the history of flight and development of airplane by Wright brothers.

Or

(b) Elaborate the development in materials, structures ad propulsion over the years.

12. (a) Describe the types of flight vehicles based of lifting type, power plant, application and wing geometry.

Or

(b) Mention the basic instruments for flying. Describe the working principle of Air speed indicator with a neat diagram.

13. (a) Explain the layers of atmosphere and temperature profile of atmosphere.

Or

(b) Define the following terms:Lift, Drag, Moment, Aerofoil and Mach number.

14. (a) Illustrate the monocoque, semi-monocoque and geodesic constructions.

Or

(b) Define factor of safety. Elaborate on the metallic and non-metallic materials used in aircraft structure.

15. (a) Explain the working of turbojet engine with a neat sketch.

Or

(b) What is the principle of operation of rocket? List the applications of rocket and the exploration into space.

PART C — (1 × 15 = 15 marks)

16. (a) At 12 km in the standard atmosphere, the pressure, density, and temperature are 1.9399 × 104N/m2, 0.3119 Kg/m3 and 216.66 K respectively. Using these values, calculate the standard atmospheric values of pressure, density, and temperature at an altitude of 18 km.

Or

(b) Drive the relation between elastic constants — Young's modulus, Bulk modulus and shear modulus.

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