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Question Paper Code : 50021

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2017
Third Semester
Aeronautical Engineering
AE 6302 – ELEMENTS OF AERONAUTICS
(Regulations 2013)

Time : Three Hours

Maximum : 100 Marks

Answer ALL questions

PART – A

(10×2=20 Marks)

1. Write a short note on balloon flight.
2. Bring out the differences between monoplanes and biplanes.
3. What are the two major constituents of the atmosphere? Name them with their average proportions.
4. Define centre of pressure.
5. What is meant by aspect ratio and state its importance?
6. List out the basic instruments which are of prime importance for flying.
7. State the uses of stringers and longerons.
8. What is meant by Hooke's law?
9. Give any two fundamental differences between piston engine and jet engine from operation point of view.
10. What is the basic function of an aircraft propeller?

PART – B

(5×13=65 Marks)

11. a) i) Write a short note on ornithopters. (5)
ii) Draw a schematic diagram of Wright brothers first successful airplane and discuss it in detail. (8)

(OR)

- b) Discuss in detail about the various materials used on airplanes over the years.

50021



12. a) i) Explain briefly about the role of carbon dioxide in atmosphere. (6)
ii) Discuss in brief about the various layers of atmosphere based on temperature variation. (7)

(OR)

- b) i) What are the ISA mean sea-level values prescribed? Using them, calculate the pressure, density and temperature values at 8 Km altitude and 26 Km altitude. (6)
ii) Draw typical aerodynamics characteristics curve of symmetric and cambered airfoil. Explain the nature of the curve. (7)

13. a) i) How do you classify different types of flight vehicle? Discuss the criteria for classification. (6)
ii) Draw various types of wings used in aircraft and how they are attached to the fuselage. Discuss them in detail. (7)

(OR)

- b) With neat sketches, explain in detail about conventional control and powered control systems used in airplanes.

14. a) Discuss in detail about the types of construction of aircraft fuselage structure with necessary sketches.

(OR)

- b) i) Explain the application of composite material in the construction of the airplane airframe. (6)
ii) Draw stress-strain diagram for brittle and ductile materials. Indicate all salient point on it and explain them. (7)

15. a) Explain in detail about turbofan engine with a neat sketch. Also compare the merits and demerits of various power plants used in aircrafts.

(OR)

- b) Explain the basic principle of operation of rocket engine. Discuss in detail about the various types of rockets with their applications.

PART - C

(1×15=15 Marks)

16. a) With neat sketch draw plain view and side view of a typical transport aircraft and mark all the important component of the airframe. Explain the functions of each components.

(OR)

- b) Discuss in detail about the metallic and non-metallic materials used on airplanes.