

Exam Date & Time: 11-Jul-2023 (02:30 PM - 05:30 PM)



MANIPAL ACADEMY OF HIGHER EDUCATION

B.TECH END SEMESTER EXAMINATIONS - MAKE UP, JULY 2023

INTRODUCTION TO AEROSPACE ENGINEERING [AAE 4303]

Marks: 50

Duration: 180 mins.

A

Answer all the questions.

Instructions to Candidates: Answer ALL questions Missing data may be suitably assumed

- 1) Write a brief note on jet streams. (2)
 - A)
 - B) Draw a schematic showing the different layers of the atmosphere with increasing altitude. (3)
 - C) Calculate the pressure and temperature at an altitude of 13 km from sea level using the International Standard Atmosphere model. (5)
- 2) How are airfoils different from the wings of an aircraft? Plot the variation of lift with the angle of attack for symmetric and cambered airfoils and a finite wing. (4)
 - A)
 - B) With a neat schematic, briefly explain the aerodynamic forces on an airfoil, the center of pressure, and the aerodynamic center. (4)
 - C) Illustrate the airfoil nomenclature of NACA 2412. (2)
- 3) Write a short note on various structural components of a fuselage. (4)
 - A)
 - B) Briefly explain the important parts and construction of an airplane wing. (4)
 - C) What is the significance of using Canards on an airplane? (2)
- 4) Why are dimples present in a golf ball? (2)

- A)
- B) Write a brief note on various drags associated with an aircraft. (3)
- C) Briefly explain the following terms:
- a. Mach number
 - b. Compressible flow
 - c. The Eulerian approach in fluid flow (5)
 - d. Streak line
 - e. Coanda effect
- 5) List the different types of engines used in an airplane. (4)
- A)
- B) Why are passenger aircraft engines so huge in size? (3)
- C) Classify rocket engines based on the type of propellants used. (3)

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