Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent unit of MAHE, Manipal)

III SEMESTER B.TECH. (AERONAUTICAL ENGINEERING)

END SEMESTER EXAMINATIONS, NOV/DEC 2018

SUBJECT: INTRODUCTION TO AEROSPACE ENGINEERING

[AAE 2103]

REVISED CREDIT SYSTEM
(26/11/2018)

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

- Answer **ALL** the questions.
- Missing data may be suitable assumed.

1A.	Analyze the terms isothermal and gradient atmospheric layers.	**2**
1B.	Define various types of altitude terminologies.	**3**
1C.	Derive and analyze hydrostatic equation with proper diagrams.	**5**
2A.	Examine compressible and incompressible flows	**2**
2B.	State and prove energy equation from fundamentals	**3**
2C.	Consider an airfoil in a flow of air, where far ahead of the airfoil, the pressure, velocity, and density are 2116 lb/ft^2, 500 mi/hr, and 0.002377 slug/ft^3, respectively. At a given point A on the airfoil, the pressure is 1497 lb/ft^2.What is the velocity at point A? Assume isentropic flow. For air, Cp=6006 ft. lb/(slug)(^{0}R). The value of gas constant (R) is 1716.	**5**
3A.	Analyze the difference between finite and infinite wings.	**2**
3B.	Consider an airfoil mounted in a low-speed subsonic wind tunnel. The flow velocity in the test section is 100 ft/s, density is 0.002377 slug/ft^3 and pressure is 2116 lb/ft^2.If the pressure at a point on the airfoil is 2102 lb/ft^2, what is the pressure coefficient?	**3**
3C.	Explain the various processes behind the formation of induced drag with proper diagrams.	**5**
4A.	Examine the need for power assisted aircraft control systems.	**2**

4B.	Analyze the various criteria for longitudinal static stability with proper diagrams and explanations.	**3**
4C.	Explain directional static stability with all necessary diagrams.	**5**
5A.	Classify some of the advanced propulsion systems. What are their advantages and limitations?	**2**
5B.	State and derive vis-viva equation from fundamentals.	**3**
5C.	Explain bi-elliptic Hohmann transfer process in detail with all necessary diagrams and equations.	**5**