No. of Printed Pages : 03 **Roll No. .....**

E-204

B. Tech. EXAMINATION, Dec. 2017

(Fifth Semester)

(B. Scheme) (Main & Re-appear)

(AER)

AER-307-B

ADVANCE AERODYNAMICS

Time : 3 *Hours*] [*Maximum Marks :* 75

Before answering the question-paper candidates should ensure that they have been supplied to correct and complete question-paper. No complaint, in this regard, will be entertained after the examination.

Note : Attempt *Five* questions in all, selecting at least *one* question from each Unit. All questions carry equal marks.

Unit I

1. Describe the method and coefficients used to transform flat plat into an airfoil.

2. Derive an expression for the moment coefficient in case of a flapped airfoil.

Unit II

3. What is Boit-Savart law ? Where is it used ? Find the expression for the velocity at a point due to linear vortex of finite length.

4. Describe the phenomenon of formation flying and ground effect. How both are useful in flying ? Explain with examples.

Unit III

5. What is a shock wave ? What are the types of shock waves ? Derive an expression for the temperature ration across a normal shock wave.

6. A normal shock occurs in a convergent divergent nozzle, the throat area of which is the half of exit area and the static pressure at exit is half of stagnation pressure at the entry. The flow except through shock is isentropic. Find the Mach number upstream and downstream of shock. The area of cross-section at the shock place.

Unit IV

7. What are the properties of isentropic flow ? Describe the variation in the properties of flow in a converging diverging duct w.r.t. varying pressure ratio across it.

8. Write notes on the following :

(a) Critical Mach No.

(b) Isentropic area ratio

(c) Whitecombárea rule.