Printed Pages : 2

EAE021

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 148655

Roll No.

B. Tech.

(SEM. VI) THEORY EXAMINATION, 2014-15

AERODYNAMICS - I

Time : **2** Hours] [Total Marks : **50**

Note : Attempt all five questions. (Choice and Marks are given below)

1 Attempt any two of the following : **2×5=10**

(a) Derive a relationship between stream function and velocity potential for irrotational flow in cartesian coordinates.

(b) Define the following with a sketch (i) uniform flow; (ii) Source flow. Also show the relations.

(c) Define compressibility. Show by diagram isentropic variation of density with Mach No.

2 Attempt any two of the followiung : **2×5=10**

(a) State Kuttajoukowski theorem. Give formula for lift generation in a wing.

(b) Define vortacity. What is the relation between circulation and vortacity.

(c) What is the effect of flaps on aerodynamic coefft ?

3 Attempt any two of the following : **2×5=10**

(a) Describe with a sketch the reflection of shock and expansion waves.

(b) What are basic Normal Shock relations ?

(c) Consider a flat plate at 5^{o} angle of attack. Calculate :

(i) Lift coefft

(ii) Moment coefft. about leading edge.

(iii) Moment coefft. at quarter chord point.

(iv) Moment coefft. about trailing edge.

4 Attempt any two of the following : **2×5=10**

(a) Derive the Blasing equation for incompressible flow over flat plate.

(b) What are the governing equations for couette flow.

(c) State Navier Stoke's equations for viscous flows.

5 Write short notes on any five of the following : **5×2=10**

(a) Effect of flaps on aerodynamic coeffts.

(b) Compressibility

(c) Prandtl Meyer Expansions

(d) Converging/Diverging ducts

(e) Poiseuille flow

(f) Symmetric aerofoil.