Printed Pages : 3

EAE-031

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

PAPER ID : 148751

Roll No.

B. Tech.

(SEM. III) (ODD SEM.) THEORY EXAMINATION, 2014-15

AERODYNAMICS-II

Time : **3** Hours] [Total Marks : **100**

Note : Attempt All five questions.
Choice and Marks are given below.

1 Attempt any two of the following : **2×10=20**

(a) Define the formula $Cd_i = \frac{CL^2}{\pi AR}$.

(b) What is Biot and Savart law ? How does it affect lift ?

(c) Derive the formula for turning flight what are V-n diagrams ?

2 Attempt any two of the following : **10×2=20**

(a) What is the effect of Aspect Ratio on a finite wing ? Write down the equation for total drag of a wing.

(b) Name the fundamental equations of Prandtl's lifting time theory and hence derive the formula for induced drag coefft.

(c) Derive the linearised velocity potential for subsonic compressible flows over an aerofoil.

3 Attempt any two parts of the following : **2×10=20**

(a) What is compressibility ? Write down equations for inviscid compressible flow.

(b) Draw the various forces affecting an airplane during take off. State the formulas.

(c) What is the effect of location of centre of gravity relative to neutral point on static stability.

4 Attempt any two of the following : **2×10=20**

(a) What is a propeller ? Show an illustration of a propeller thereby showing variation of pitch along a blade. Write down formulas for propeller efficiency and advance ratio.

(b) Write short note on the following :

(i) Critical mach no

(ii) Aspect Ratio

(iii) Dutch Roll

(iv) Sweep Back effects.

(c) Write down the equations of motion for dynamic longitudinal stabilities.

5 Attempt any two parts of the following : **10×2=20**

(a) Briefly describe drag divergence with a sketch.

(b) Write short notes on the following :
   (i) autorotation and spin
   (ii) accelerated flights
   (iii) pitching moment
   (iv) centre of pressure.

(c) What is the effect of centre of gravity relative to neutral point on static stability.
