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Total No. of Pages : 02

Total No. of Questions : 09

B.Tech.(ANE) (Sem.-8)

AEROELASTICITY

Subject Code : ANE-412

M.Code : 70494

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTION TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.
4. Make suitable assumptions wherever required.

SECTION-A**1. Write briefly :**

- a) What is flutter?
- b) List dynamic aeroelastic phenomena.
- c) State the difference between control effectiveness and control system reversal.
- d) State the effects of flutter on the design of high speed aircraft.
- e) How are wing planform and aspect ratio affected by flutter characteristics?
- f) State ways of avoiding Aileron reversal.
- g) What is load distribution problem in aeroelasticity?
- h) List three wing critical speeds.
- i) Why is sweep forward rated out as a design option from the aeroelastic pointview?
- j) Differentiate between classical flutter and stall flutter.

SECTION-B

2. Sketch qualitatively the relation between critical speeds of a typically wing with varying amounts of rearward and forward sweep and explain it.
3. What is semirigid theory? Derive an expression for the divergence dynamic pressure of an idealized cantilever wing using semirigid assumption.
4. List the dimensionless parameter which affect the flutter speed of a simple two-degrees of freedom system of a wing. Sketch the effect of density ratio on the dimensionless flutter speed with the dimensionless static unbalance as a parameter.
5. Differentiate between phenomena of buffeting and stall flutter.
6. List the objects other than aircraft structures which encounter vibration troubles of aeroelastic origin. Why are such problems undesirable?

SECTION-C

7. Explain the method of determining an approximate flutter speed using Galerkin's method.
8. Outline the method of determining divergence speed of a uniform rectangular wing using successive approximations.
9. Write notes on :
 - a) Galloping of transmission lines
 - b) Methods of preventing classical flutter

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.