

B.E DEGREE EXAMINATIONS: JUNE/JULY 2013

Fifth Semester

AERONAUTICAL ENGINEERING

AER111: Computational Fluid Dynamics

Time: Three Hours

Maximum Marks: 100

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. The base principle in continuity equation is _____
 - a) Mass is conserved
 - b) Momentum is conserved
 - c) Energy is conserved
 - d) Force is conserved
2. Very difficult in CFD is capturing the _____ of the flow.
 - a) Intensity
 - b) Viscosity
 - c) Shock
 - d) Turbulence
3. Inviscid, irrotational, incompressible flow is governed by _____
 - a) Euler's equation
 - b) Laplace's equation
 - c) Bernoulli's equation
 - d) Reynolds's equation
4. Vortex flow is _____
 - a) Rotational
 - b) Bi-directional
 - c) Irrotational
 - d) Axial
5. Governing equation of Subsonic problem will be _____
 - a) Parabolic
 - b) Hyperbolic
 - c) Elliptic
 - d) Linear
6. _____ condition will alert the unstable behavior of the solution
 - a) $|\epsilon_i^{n+1} / \epsilon_i^n| \leq 1$
 - b) $|\epsilon_i^{n+1} / \epsilon_i^n| > 1$
 - c) $|\epsilon_i^{n+1} / \epsilon_i^n| = 0$
 - d) $|\epsilon_i^{n+1} / \epsilon_i^n| \neq 1$
7. In FEM, domain is subdivided into cells, called _____
 - a) Volume
 - b) Element
 - c) Face
 - d) Surface
8. Standard finite element method is based on a _____
 - a) Weak Formulation
 - b) Strong Formulation
 - c) Normal Formulation
 - d) Regular Formulation

(OR)

b) Explain about the various stability regions and its significance in CFD

24. a) Explain the basic observations and features of 'Discretization using FEM'.

(OR)

b) Write in detail about any two of the formulations available in FEM.

25. a) Explain in detail about the Runge-Kutta multi-stage time stepping.

(OR)

b) Explain cell-vertex scheme for solving non-overlapping and overlapping control volumes.
