Code.No: R05410306 | R05 | SET-1

IV B.TECH – I SEM EXAMINATIONS, NOVEMBER - 2010
COMPUTATIONAL FLUID DYNAMICS
(MECHANICAL ENGINEERING)

Time: 3hours **Max.Marks:80**

Answer any FIVE questions
All questions carry equal marks
- - -

1. a) Enumerate the use of Computational Fluid dynamics with experimental and theoretical investigation.
   b) Briefly explain how the Computational fluid dynamics plays a strong role as a design tool. [6+10]

2. a) What are Dirichlet and Neumann Boundary conditions?
   b) Derive Navier Stokes Equation in conservative form. [6+10]

3. a) How the conservation form of equations are convenient for numerical solution?
   b) Explain the two methods available to capture shocks in fluid flow with suitable grids. [8+8]

4. a) What are the parabolic, hyperbolic and elliptic equations? Write one practical application for each equation.
   b) Explain the nature of parabolic equations with domain of dependence and domain of influence. [6+10]

5. a) What are implicit and explicit methods? Write their merits and demerits.
   b) Obtain the finite difference equation for unsteady one dimensional heat conduction equation. [8+8]

6. a) Illustrate the difference between the grid in physical plane and in computational plane.
   b) Explain how the curvilinear grid in physical plane is suitable to compute the flow field variables using CFD. [8+8]

7. What is boundary fitted coordinate system? Explain the elliptic grid generation over an airfoil? [16]

8. What are the hyperbolic grid generation methods? Obtain the expression for hyperbolic grid generation using Jacobian relation. [16]

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Code.No: R05410306 | R05 | SET-2

IV B.TECH – I SEM EXAMINATIONS, NOVEMBER - 2010
COMPUTATIONAL FLUID DYNAMICS
(MECHANICAL ENGINEERING)

Time: 3hours **Max.Marks:80**

Answer any FIVE questions
All questions carry equal marks
- - -

1. a) How the conservation form of equations are convenient for numerical solution?
   b) Explain the two methods available to capture shocks in fluid flow with suitable grids. [8+8]

2. a) What are the parabolic, hyperbolic and elliptic equations? Write one practical application for each equation.
   b) Explain the nature of parabolic equations with domain of dependence and domain of influence. [6+10]

3. a) What are implicit and explicit methods? Write their merits and demerits.
   b) Obtain the finite difference equation for unsteady one dimensional heat conduction equation. [8+8]

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5. What is boundary fitted coordinate system? Explain the elliptic grid generation over an airfoil? [16]

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7. a) Enumerate the use of Computational Fluid dynamics with experimental and theoretical investigation.
   b) Briefly explain how the Computational fluid dynamics plays a strong role as a design tool. [6+10]

8. a) What are Dirichlet and Neumann Boundary conditions?
   b) Derive Navier Stokes Equation in conservative form. [6+10]

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Code.No: R05410306 | R05 | SET-3

IV B.TECH – I SEM EXAMINATIONS, NOVEMBER - 2010
COMPUTATIONAL FLUID DYNAMICS
(MECHANICAL ENGINEERING)

Time: 3hours **Max.Marks:80**

Answer any FIVE questions
All questions carry equal marks
- - -

1. a) What are implicit and explicit methods? Write their merits and demerits.
   b) Obtain the finite difference equation for unsteady one dimensional heat conduction equation. [8+8]

2. a) Illustrate the difference between the grid in physical plane and in computational plane.
   b) Explain how the curvilinear grid in physical plane is suitable to compute the flow field variables using CFD. [8+8]

3. What is boundary fitted coordinate system? Explain the elliptic grid generation over an airfoil? [16]

4. What are the hyperbolic grid generation methods? Obtain the expression for hyperbolic grid generation using Jacobian relation. [16]

5. a) Enumerate the use of Computational Fluid dynamics with experimental and theoretical investigation.
   b) Briefly explain how the Computational fluid dynamics plays a strong role as a design tool. [6+10]

6. a) What are Dirichlet and Neumann Boundary conditions?
   b) Derive Navier Stokes Equation in conservative form. [6+10]

7. a) How the conservation form of equations are convenient for numerical solution?
   b) Explain the two methods available to capture shocks in fluid flow with suitable grids. [8+8]

8. a) What are the parabolic, hyperbolic and elliptic equations? Write one practical application for each equation.
   b) Explain the nature of parabolic equations with domain of dependence and domain of influence. [6+10]

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Code.No: R05410306 | R05 | SET-4

IV B.TECH – I SEM EXAMINATIONS, NOVEMBER - 2010
COMPUTATIONAL FLUID DYNAMICS
(MECHANICAL ENGINEERING)

Time: 3hours **Max.Marks:80**

Answer any FIVE questions
All questions carry equal marks
- - -

1. What is boundary fitted coordinate system? Explain the elliptic grid generation over an airfoil? [16]

2. What are the hyperbolic grid generation methods? Obtain the expression for hyperbolic grid generation using Jacobian relation. [16]

3. a) Enumerate the use of Computational Fluid dynamics with experimental and theoretical investigation.
   b) Briefly explain how the Computational fluid dynamics plays a strong role as a design tool. [6+10]

4. a) What are Dirichlet and Neumann Boundary conditions?
   b) Derive Navier Stokes Equation in conservative form. [6+10]

5. a) How the conservation form of equations are convenient for numerical solution?
   b) Explain the two methods available to capture shocks in fluid flow with suitable grids. [8+8]

6. a) What are the parabolic, hyperbolic and elliptic equations? Write one practical application for each equation.
   b) Explain the nature of parabolic equations with domain of dependence and domain of influence. [6+10]

7. a) What are implicit and explicit methods? Write their merits and demerits.
   b) Obtain the finite difference equation for unsteady one dimensional heat conduction equation. [8+8]

8. a) Illustrate the difference between the grid in physical plane and in computational plane.
   b) Explain how the curvilinear grid in physical plane is suitable to compute the flow field variables using CFD. [8+8]

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