

Conversional principle of mass and energy. (b)

Inviscid flow (d)

Discretization method. (e)

Creeping flow

Define the following.

Computational fluid dynamics

Time : 3 Hours

(a)

(f)

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1.

Max. Marks : 100

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

B.TECH.

Theory Examination (Semester-VI) 2015-16

Section-A

Paper ID :151655

NCH-011/ECH-022

COMPUTATIONAL FLUID DYNAMICS

 $(2 \times 10 = 20)$

Roll No.

- (g) Flat plate boundary layer.
- (h) Unsteady state heat conduction
- (i) Reynolds stress equation model
- (j) Applications of CFD

Section-B

2. Attempt any five parts of the following. $(10 \times 5 = 50)$

(a) What are the various methods of discretization. Discuss any one method.

(b) Discuss the classification of flows.

- (c) Give the conditions for transition from laminar to turbulent flow. What is the effect of turbulence on time averaged Navier-Stokes equations?
- (d) Give the equations for dimensional unsteady state heat conduction. Mention the initial and final boundary conditions for this.
- (e) Write a short note on characteristics of simple turbulent flow.

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- (f) Describe the flow in sudden pipe contraction or expansion.
- (g) Define structured and unstructured grids. What are the modern developments in grid generations in solving the engineering problems?
- (h) Write a short note on the comparisons of analytical and numerical methods of solution.

Section-C

Note: Attempt any two parts of the following.

(15×2=30)

- 3. Discuss the flow and heat transfer in complex tubes and channels.
- 4. Explain finite difference method in brief and give the advantage of this method over others.
- 5. Describe the various types of turbulence models.