Registration no: | | | | | | | | | | |

Total Number of Pages: 02

B.Tech
PEME5404

7th Semester Regular / Back Examination 2017-18
COMPUTATIONAL FLUID DYNAMICS
BRANCH:MECH
Time: 3 Hours
Max Marks: 70
Q.CODE: B415

Answer Question No.1 which is compulsory and any five from the rest.
The figures in the right hand margin indicate marks.

Q1 **Answer the following questions:** **(2 x 10)**

a) What is CFD? Mention two applications of CFD.
b) What do you mean by discretization?
c) Define boundary condition.
d) FEM is not very accurate as compared to FDM. True or False?
e) Write full form of QUICK Scheme.
f) What do you mean by stable solution?
g) What is convergence?
h) What is diffusion ?
i) Define unsteady heat conduction.
j) What is consistency?

Q2 **a)** What are the properties of discretization schemes? Explain Briefly. **(5)**
b) Briefly describe power law scheme for convection diffusion problem. **(5)**

Q3 **a)** Derive the finite volume method for one dimensional steady state diffusion equation. **(5)**
b) Briefly describe tri-diagonal matrix algorithm. **(5)**

Q4 **a)** Why development of Upwind Scheme is needed? Explain first order upwind scheme in detail. **(5)**
b) Briefly describe the hybrid differencing scheme. **(5)**

Q5 **a)** Explain Finite Volume Method for one dimensional Unsteady heat conduction. **(5)**
b) Explain and list the differences between fully implicit and explicit methods. **(5)**

Q6 Derive transient convection-diffusion equation using QUICK differencing. **(10)**

Q7 Explain in brief finite difference, finite element and finite volume method to discretize the computational domain. **(10)**

Q8 **Write short answer on any TWO:** **(5 x 2)**

a) Crank Nicolson scheme

b) Central differencing scheme.

c) High order differencing schemes

d) Stability and convergence