

Total No. of Questions : 10]

SEAT No. :

P2233

[Total No. of Pages : 2

[5254]-564

B.E. (Automobile) (End Sem)

FUNDAMENTALS OF COMPUTATIONAL FLUID DYNAMICS

(2012 Pattern) (Elective -I)

Time : 2.30 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *Answer one question from Q.1 or Q2, Q3 or Q4, Q5 or Q6, Q7 or Q8, Q9 or Q10.*
- 2) *Figures to the right indicate full marks.*
- 3) *Assume suitable data if necessary.*
- 4) *Neat diagrams must be drawn whenever necessary.*

Q1) a) Explain strengths and weakness of CFD. **[6]**

b) Explain preprocessor in CFD. **[4]**

OR

Q2) a) Explain Need of discretization. **[6]**

b) Explain in short flow modeling using control volumes. **[4]**

Q3) a) Derive **[10]**

$$\frac{D}{Dt} = \frac{\partial}{\partial t} + (V * \nabla)$$

OR

Q4) $x_1 + 2x_2 = 4$ **[10]**

$$-x_1 + x_2 + 2x_3 = 1$$

$$x_2 + 3x_3 + x_4 = 7$$

$$2x_3 + 2x_4 = 8$$

Solve by Thomas Algorithm

P.T.O

- Q5)** a) Explain phase relative error for upstream differencing scheme. [8]
b) Explain first order wave equation solution with Lax Wendroff scheme.[8]

OR

- Q6)** a) Explain first order wave equation solution with Maccormack method.[8]
b) Explain the amplification factor modulus for upstream differencing scheme. [8]

- Q7)** a) Explain boundary conditions for the pressure correction method. [8]
b) Explain the numerical procedure using SIMPLE algorithm. [8]

OR

- Q8)** a) Explain the numerical procedure using SIMPLER algorithm. [8]
b) Explain finite volume method. [8]

- Q9)** a) Explain post processing in CFD. [10]
b) How convergence is monitored in CFD. [4]
c) Draw the flow chart for various flow physics. [4]

OR

- Q10)**a) Explain the solver settings in CFD. [10]
b) Explain K-6 model equation with it's advantages and disadvantages. [8]

