Reg.No. \_\_\_\_\_\_\_\_\_\_\_\_



**UNIVERSITY**

(Karunya Institute of Technology & Sciences)

(Declared as Deemed-to-be University under Sec.3 of the UGC Act, 1956)

**End Semester Examination – Nov/Dec – 2016**

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | **Semester :** | **2016-17 ODD** |
| **Code :** | **14AE2019** | **Duration :** | **3hrs** |
| **Sub. Name :** | **COMPUTATIONAL FLUID DYNAMICS** | **Max. marks :** | **100** |

**ANSWER ALL QUESTIONS (5 x 20 = 100 Marks)**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Sub Div.** | **Questions** | | **Course**  **Outcome** | | **Marks** |
| 1. | a. | Define Computational fluid dynamics. | | CO1 | | **2** |
| b. | State the mathematical properties of elliptic, parabolic and hyperbolic equation. | | CO1 | | **3** |
| c. | Derive the Continuity equation in differential form with neat sketch. | | CO1 | | **15** |
| **(OR)** | | | | | | |
| 2. | a. | State Momentum Principle. | | CO1 | | **5** |
| b. | Derive the momentum equation in differential form with neat sketch. | | CO1 | | **15** |
| 3. | a. | Describle types of relaxation methods used in CFD. | | CO2 | | **5** |
|  | b. | Explain in detail about relaxation technique with suitable diagram. | | CO2 | | **15** |
| **(OR)** | | | | | | |
| 4. |  | Derive the 3-D energy equation in differential form with neat sketch. | | CO1 | | **20** |
| 5. |  | Explain in detail about transport equations with suitable diagram. | | CO1 | | **20** |
| **(OR)** | | | | | | |
| 6. | a. | Explain the grid generation technique based on the PDE. | | CO2 | | **10** |
|  | b. | Write short notes on elliptic grid generation technique. | | CO2 | | **10** |
| 7. | a. | Differentiate explicit and implicit methods with neat sketch. | | CO2 | | **10** |
|  | b. | Describe the SIMPLER method with suitable flowchart. | | CO2 | | **10** |
| **(OR)** | | | | | | |
| 8. | a. | | Differentiate Finite difference and Finite volume method. | | CO3 | **5** |
|  | b. | | State any one Finite volume formulation for heat transfer occurs in 1m length of rod. | | CO3 | **15** |
|  | | | **Compulsory:** | |  |  |
| 9. | a. | | Explain in detail about Turbulence models used in the viscous flow medium. | | CO3 | **20** |

ALL THE BEST