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



**End Semester Examination – Nov/Dec– 2017**

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| **Code :** | **14AE2019** | **Duration :** | **3hrs** |
| **Sub. Name :** | **COMPUTATIONAL FLUID DYNAMICS** | **Max. marks :** | **100** |

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

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| **Q. No.** | **Sub Div.** | **Questions** | **Course**  **Outcome** | | **Marks** | |
| 1. | a. | Enumerate the conservation laws of physics involved in development of Navier- stokes equation. | | CO1 | | 4 |
| b. | Draw the mass balance in the fluid element and derive the unsteady -three dimensional mass conservation equation for a compressible fluid. | | CO1 | | 16 |
| (OR) | | | | | | |
| 2. | a. | State and classify the forces acting on a fluid particle. | | CO1 | | 4 |
|  | b. | Derive the X- direction momentum equation for three dimensional flows from the first principles. | | CO1 | | 16 |
|  |  |  | |  | |  |
| 3. |  | Formulate the discretized equation for one- dimensional diffusion problem in finite volume method. | | CO1 | | 20 |
| (OR) | | | | | | |
| 4. |  | Classify the Partial differential equations and give the practical applications for each type of PDE’s. | | CO1 | | 20 |
|  |  |  | |  | |  |
| 5. | a. | Explain CFD simulation procedure with suitable example in fluid flow or heat transfer giving   1. Problem definition 2. Grid generation 3. Boundary conditions 4. Post processing | | CO1 | | 16 |
|  | b. | Explain different types of grids. | | CO1 | | 4 |
| (OR) | | | | | | |
| 6. |  | Write down the step by step procedure for Simple algorithm to solve a fluid flow problem and draw a flow chart. | | CO1 | | 20 |
|  |  |  | |  | |  |
| 7. |  | Enumerate the most common boundary conditions in the discretized equation and explain any two conditions in detail. | | CO1 | | 20 |
| (OR) | | | | | | |
| 8. |  | What is turbulence? Briefly explain about k-ε model. | | CO1 | | 20 |
|  | |  | |  | |  |
|  | | **Compulsory:** | |  | |  |
| 9. |  | Classify the various modelling approaches in the combustion modelling and explain any one in detail. | | CO1 | | 20 |

ALL THE BEST