Name: **Enrolment No:**	

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, May 2023

Programme Name: M. Tech (PE) **Semester : II**
Course Name : Computational Fluid Dynamics **Time : 03 hrs.**
Course Code : PEAU 7023 **Max. Marks : 100**
Nos. of page(s) : 01
Instructions: All questions are compulsory

SECTION A

S. No.		Marks	CO
Q 1	Explain the application of CFD as research tool with example.	**4**	**CO1**
Q 2	Write the basic steps to solve the CFD related problem.	**4**	**CO1**
Q 3	Illustrate conservative relation for a Newtonian fluid.	**4**	**CO2**
Q 4	Summarize mass transfer approach in CFD.	**4**	**CO2**
Q 5	Write the advantages of CFD over experimental methods.	**4**	**CO1**
	SECTION B		
Q 6	Write a difference between empirical and CFD approach to solve the problem related to fluid motion. OR Explain the equation of state with suitable formulation.	**10**	**CO1**
Q 7	Derive the equation for Navier-stokes equation for Newtonian flow.	**10**	**CO2**
Q 8	Explain forward, backward, and central difference method.	**10**	**CO2**
Q 9	Derive the conservative form of continuity and momentum equation	**10**	**CO3**
	SECTION-C		
Q 10	Consider steady, fully developed laminar fluid flow through square duct in z-Direction. Derive the partial differential equation and solve the equation considering uniform grid spacing. Assume no flow on the wall of the duct with the constant as -1000. (Assume six element discretization)	**20**	**CO3**
Q 11	Illustrate the Analysis of numerical scheme with suitable example.	**20**	**CO4**