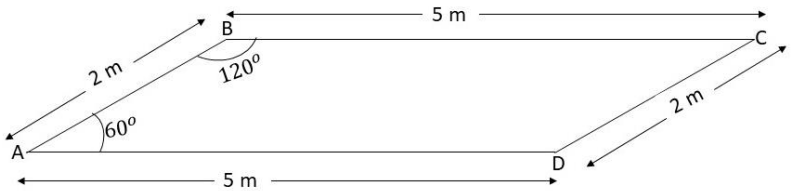
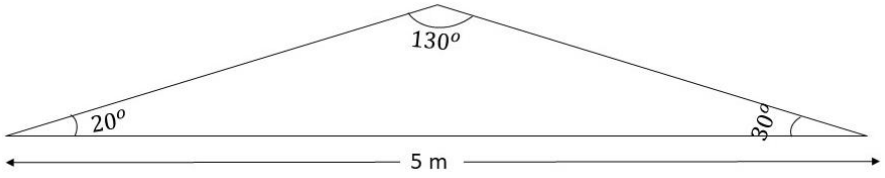
Name: **Enrolment No:**	

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, Dec 2022 - Jan 2023

Course: Grid Generation Techniques **Semester: I**
Program: M.Tech CFD **Time 03 hrs.**
Course Code: ASEG 7023 **Max. Marks: 100**

SECTION A

S. No.		Marks	CO
Q 1	Discretize transient one-dimensional heat equation.	**4**	**CO1**
Q 2	Derive the Matrices and Jacobian of transformation.	**4**	**CO1**
Q 3	Discuss the role of grid sizing in CFD.	**4**	**CO2**
Q 4	Explain the steps involved in cubic spline method of structured grid generation	**4**	**CO3**
Q 5	Summarize the concept of domain nodalisation and triangulation.	**4**	**CO4**
	SECTION B		
Q 6	Transform Laplace equation from physical plane to computational plane.	**10**	**CO1**
Q 7	Determine the aspect ratio and skewness of the following element:  **OR** Determine the aspect ratio and skewness of the following element:  	**10**	**CO2**
Q 8	Brief about the mapping and sweeping method for grid generation.	**10**	**CO2**
Q 9	Emphasis on the methodology of elliptical partial differential method for generation of structured grid.	**10**	**CO3**
	SECTION-C		
Q 10	Apply Lagrange interpolation method to map the physical axis (x) to computational axis (ε) using the coordinates of the nodes given below:	**20**	**CO3**

Node	x- coordinate	Corresponding ε-coordinate
N_0	1	1
N_1	3	2
N_2	11	3

OR

Apply Hermite polynomial method to map the physical axis (x) to computational axis (ε) using the coordinated of the nodes given below:

Node	x- coordinate	Corresponding ε-coordinate
N_0	1	1
N_1	4	2
N_2	9	3

Q 11	Formulate the process of advancing front method for the generation of unstructured grid and hence explain various steps involved in the process with the help of a diagram.	**20**	**CO4**