Menofia University
Faculty of Engineering Shebien El-kom
Basic Engineering Sci. Department.
2nd semester Examination, 2013-2014
Date of Exam : 16/6/2014

Subject: Theoretical Basics of Fluid Dynamics.
Code: BES 311
Year : Master (Grade 500)
Time Allowed : 3 hrs
Total Marks: 100 Marks

Answer the following questions

Question 1 (25 marks)

Write short notes on :

1. Continuum Hypothesis.
2. Mean free path.
3. Classifications of flow phenomena.
4. Geometric and Dynamic similarity.
5. Characteristic parameters of Boundary layer.

Question 2 (25 marks)

(A) Derive the continuity equation in Cartesian coordinates and put it in dimensionless form.

(B) Derive the Navier-Stokes equation in Cartesian coordinates and put it in dimensionless form.

Question 3 (25 marks)

1. Estimate the Boundary layer thickness (δ).
2. Estimate the wall (skin) friction coefficient in Cartesian coordinates.
3. Estimate the friction drag and drag coefficient in Cartesian coordinates.

Question 4 (25 marks)

Determine the stagnation point, contour equation, maximum half thickness, pressure coefficient and pressure coefficients on contour surface for

1. Ranking half body.
2. Fixed cylinder.
3. Rotating cylinder.

This exam measures the following ILOs											
Question Number	Q1-1	Q1-2	Q1-3	Q1-4	Q3-1,2,3	Q4-1,2,3			Q2-a	Q2-b	
Skills	Q1-5										
	Knowledge &understanding skills				Intellectual Skills				Professional Skills		

With my best wishes

Asst. Prof. Dr. Islam M. Eldesoky