Menofia University
Faculty of Engineering Shebien El-kom
Basic Engineering Sci. Department.
2nd semester Examination, 2014-2015
Date of Exam : 10 / 6 / 2015

Minoufia University

Subject: Fluid Mechanics.
Code: BES 645
Year : Master (Grade 600)
Time Allowed : 3 hrs
Total Marks: 100 Marks

Answer all 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

Associate Prof. Dr. Islam M. Eldesoky