DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Mid Semester Examination – Oct 2018

Course: B. Tech in Mechanical Engineering　　　　　　　**Sem: III**

Subject Name:　Fluid Mechanics

Subject Code: BTEEC 303

Max Marks:　20　　　　　**Date:-10/10/2018**　　　　**Duration:- 1　Hr.**

Instructions to the Students:
1. All the questions should be solved in one answer book only attach extra supplement if required.
2. Draw neat and labelled diagram whenever necessary.
3. Assume suitable data whenever necessary.
4. Figures to the right indicate full marks

	(Level/CO)	Marks
		6

Q. 1

1. Weight of liquid that rises in a capillary tube is supported by　　　　　　　CO1
a) The friction between the tube wall & the liquid
b) The atmospheric pressure
c) The vertical component of force due to surface tension
d) The curvature of the meniscus

2. The metacentric heights of two floating bodies A and B are 1 m and 1.5 m　　CO2
respectively. Select the correct statement.
(a) The bodies A and B have equal stability
(b) The body A is more stable than body B
(c) The body B is more stable than body A

3. The capillary depression in mercury is on account of　　　　　　　CO1
a) Adhesion being greater than cohesion
b) Surface tension being larger than the viscosity
c) Cohesion being greater than the adhesion
d) Vapor pressure being small

4. Which of the following is a case of turbulent flow?　　　　　　　CO3
a) Flow of oil in measuring instruments 　　　b) Flow in sap in trees
c) Flow of water through pipe 　　　　　　　d) Flow of blood in arteries

5. Stream function is defined for　　　　　　　CO3
a) Flow of a perfect fluid only 　　　b) All 2-D incompressible flows
c) All 3-D flows 　　　　　　　　　d) All irrotational flows only

6. Falling drops of water become spheres due to the property of　　　　CO1
(a) Surface tension of water　　　　(b) Compressibility of water
(c) Capillarity of water　　　　　　(d) Viscosity of water

Q.2　Solve Any Two of the following　　　　　　　　　　　　　　**3 X 2**

(A) An incompressible fluid of kinematic viscosity 7.4x10-7 m2/s and specific　　CO1
gravity=0.88 is held between two parallel plates. If the top plate is moved with a
velocity of 0.5 m/s while the bottom one is held stationary, the fluid attains a linear
velocity profile in the gap of 0.5 mm between these plates. Predict the shear stress
in Pascal on the surfaces of top plate.

(B) Construct the Continuity equation for three dimensional flow.　　　　　CO3

(C) Show Intensity of Pressure at point is equal to specific weight of fluid at that point.　　CO1

Q. 3 Solve Any One of the following 8

(A) The velocity components in two-dimensional flow field are as follows: CO3

$$u = \frac{y^3}{3} + 2x - x^2y \quad v = xy^2 - 2y - \frac{x^3}{3}$$

1) Examine flow is possible or not
2) Deduce the expression for stream function
3) Deduce the expression for velocity potential function

(B) Estimate the total pressure force and center of pressure for vertical surface submerged in liquid. CO2

*** End ***