KADI SARVA VISHWAVIDHYALAYA

B.E MECHANICAL Semester–IV

Mid Semester Examination-2015

Subject: Fluid Mechanics **Date: 05/03/2015**

Subject Code: ME-306 /AE306 **Time: 12am to 1:30 pm**

Total Marks: 30

Instructions:

1. Answer each section in separate Answer sheet.
2. Use of Scientific calculator is permitted.
3. All questions are **Compulsory**.
4. Indicate **clearly**, the options you attempt along with its respective question number.

Que:1 (A) Explain phenomenon capillarity action with neat sketch. **[5]**

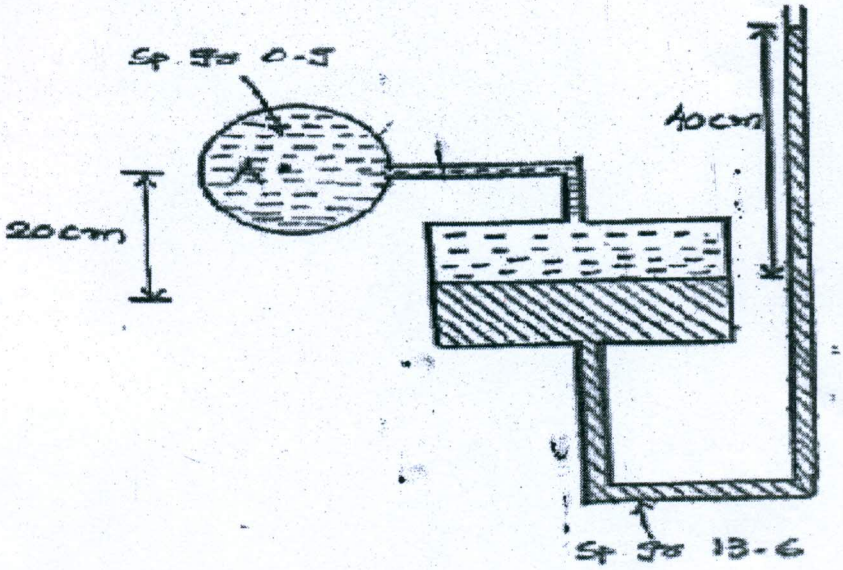
(B) An oil of viscosity 4 poise is used for lubrication between a shaft and sleeve. The diameter of the shaft is 0.5 m and it rotates at 250 rpm. Calculate the power lost in oil for a sleeve length of 100 mm. The thickness of oil film is 1 mm. **[5]**

Que:2 (A) Define Following

(1) Specific Gravity
(2) Manometer
(3) Cavitations
(4) Surface tension

[5]

(B) A single column manometer is connected to a pipe containing a liquid of specific gravity 0.9 as shown in fig. Find the pressure in pipe if the area of the reservoir is 100 times the area of the tube for the manometer reading as shown in fig. The specific gravity of mercury is 13.6.



[5]

OR

(A) Derive momentum equation for 3D in Cartesian Coordinates. **[5]**

(B) State hydrostatic law. Derive equation for variation of pressure vertically **[5]**

for a fluid under the gravity.

Que:3 (A) Write a note on Principle of Venturimeter and derive an equation for theoretical discharge. **[5]**

(B) A horizontal venturimeter connected to a pipe of 20 cm dia. has 10 cm dia. throat. The difference of pressure between the inlet and the throat is measured by a differential mercury manometer, which shows the deflection of 30 cm. If the coefficient of discharge of VM is 0.97, calculate the discharge of water passing through the pipe. **[5]**

OR

(A) Derive Acceleration components for Eulerian and Lagrangian frame of reference. **[5]**

(B) The velocity vector in a flow field is given by $V = 3x^3i - 2x^2yj$. Determine the velocity, local acceleration and convective acceleration of a fluid particle in this flow field at (1,3,2). Is this flow steady or unsteady? Is it two or three dimensional? **[5]**

Best of luck