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Daffodil International University

B. Sc. in Civil Engineering

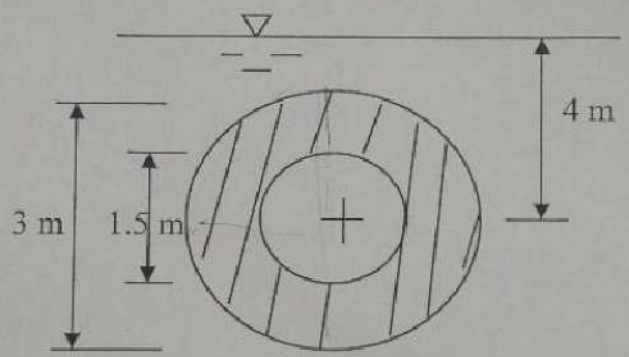
Mid Term Examination, Spring - 2026

Course Code: CE 205	Course Title: Fluid Mechanics	
Section: A; B & C	Level-Term: 2-2	Teacher's Initial: MA
Full Marks: 25	Date: 28th February, 2026	Time: 1.5 Hours

Note: There are four set of questions in total. Answer all of them. Right hand margin indicates full marks.

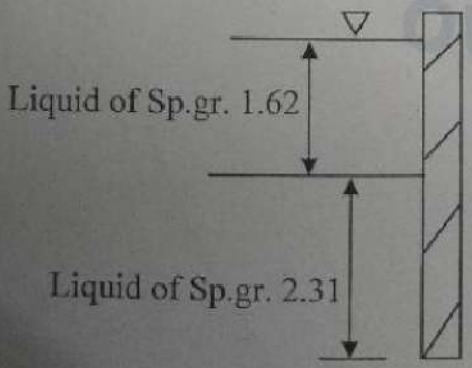
1. (a) What is your understanding about capillary effect? Derive an equation for capillarity of water. *[CO1, C2]* [03]

   (b) A hollow circular plate of 3 m external and 1.5 m internal diameter is immersed vertically in water, such that the centre of the plate is 4 m deep from the water surface as shown in the figure given below. Calculate the total pressure and depth of the centre of pressure. *[CO2, C4]* [03]



2. (a) State and show the equation of continuity of a liquid flow. *[CO1, C2]* [03]

   (b) Determine the magnitude and line of action of the pressure exerted on the side of a tank, which is 2.95 m square and 8.5 m deep. The tank is filled half full with a liquid having a specific gravity of 2.31, while the remainder is filled with a liquid having a specific gravity of 1.62. *[CO2, C4]* [04]

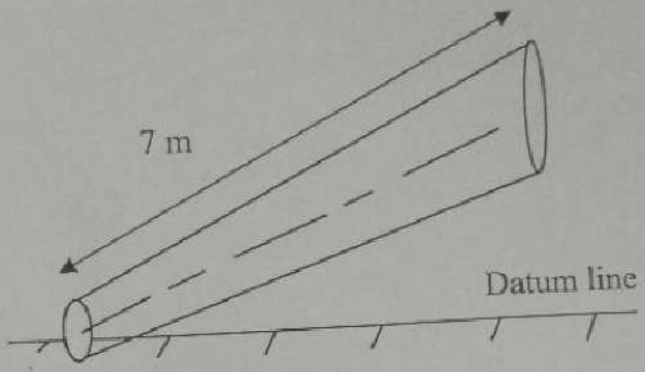


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3. (a) Extend your understanding of the terms: i) Laminar flow ii) Piezometer tube. *[CO1, C2]* [02]

(b) A pipe 7 m long is inclined at an angle of 18^0 with the horizontal. The smaller section of the pipe, which is at a lower level, is of 95 mm diameter and the larger section of the pipe is of 260 mm diameter as shown in figure. Determine the difference of pressure between the two sections, if the pipe is uniformly tapering and the velocity of water at the smaller section is 1.5 m/s. *[CO3, C3]* [04]



4. (a) Proof that center of pressure is always below the center of gravity of the area by a distance equal to $I_G/(AX)$. *[CO1, C2]* [03]

(b) Calculate the capillary effect in millimeters in a glass tube of 5.5 mm diameter, when immersed in (i) water and (ii) in mercury. The values of surface tension for water and mercury in contact with air are 0.0835 N/m and 0.6100 N/m respectively. The contact angle for water 0^0 and for mercury 135^0. *[CO2, C4]* [03]

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