UNIVERSITY OF RUHUNA

Faculty of Engineering

End-Semester 2 Examination in Engineering: March 2026

Module Number: CE2201 **Module Name: Fundamentals of Fluid Mechanics (C-18)**

Section B **[One and Half Hours]**

[Answer **all questions**, each question carries fifteen marks.]
All standard notations denote their usual meanings.

Q1. a) A differential manometer is attached to a pipe, as shown in Figure Q1A. Calculate the pressure difference between points A and B.

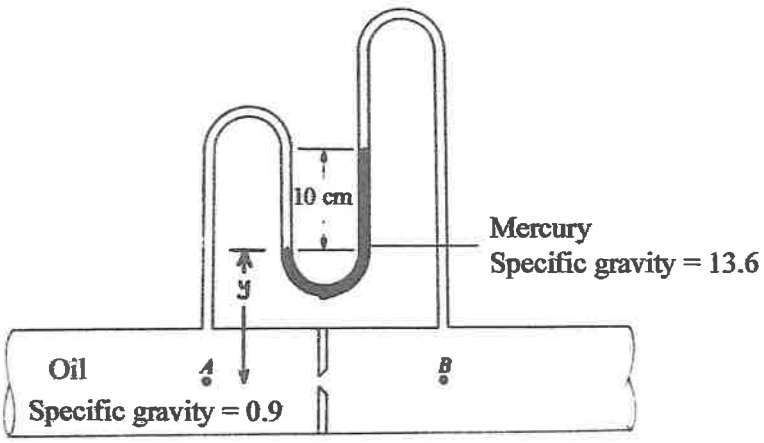

Figure Q1A

[3 Marks]

b) A 2.4 m diameter cylinder weighs 225 kg and rests on the bottom of a tank that is 1 m long. Water and oil are poured into the left- and right-hand portions of the tank to depths of 0.6 m and 1.2 m, respectively (Figure Q1B). Calculate the magnitudes of the horizontal and vertical components of the force that will keep the cylinder touching the tank at B.

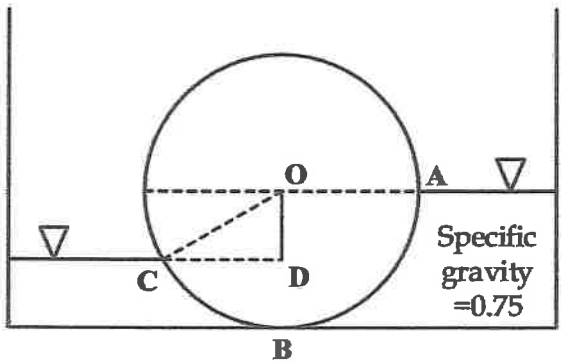

Figure Q1B

[12 Marks]

Q2. Figure Q2 shows a pump drawing water from a reservoir and discharging into atmosphere at point B. The pressure at point A in the suction pipe is a vacuum of 25 cm mercury, and the discharge is 85 l/s. Suction (AP) and delivery (PB) pipes are with 10 m and 100 m lengths, respectively, and the friction coefficient is 0.01.

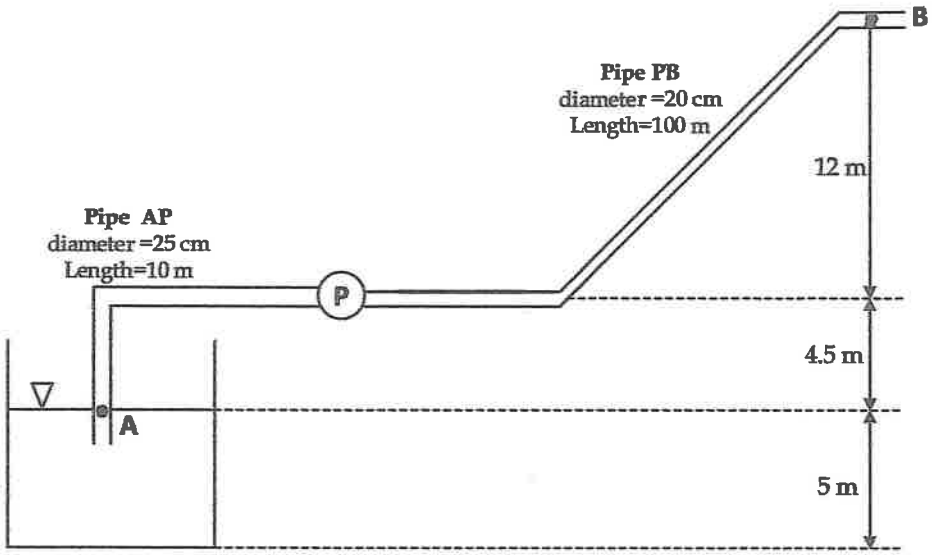

Figure Q2

(i) Calculate the total head at point A and at point B with respect to a datum at the base of the reservoir.

[5 Marks]

(ii) Neglecting minor head losses, determine the head added by the pump to deliver 85 l/s of water.

[6 Marks]

(iii) The jet of water issued at B strikes a vane moving at a speed of 1 m/s. Calculate the force exerted by the jet for a vane angle of 60°.

[4 Marks]