



K. K. Wagh Institute of Engineering Education & Research, Nashik
(An Autonomous Institute From A.Y. 2022-23)

InSem Examination-I Winter2024	
Exam Seat No.:	
Academic Year:2024-2025	Semester:III
Class:SY	Program:B.Tech
Branch Code:CIV	Pattern:2023
Name of Course:Hydraulics	Course Code:2304206
Max. Marks:30	Duration: 01 Hrs. 30 Min.

Instructions: Candidates should read carefully the instructions printed on the Question Paper and on the cover page of the Answer Book, which is provided for their use.

1. This question paper contains 02 pages.
2. Answer to each new question is to be started on a new page.
3. Assume suitable data wherever required, but justify it.
4. Draw the neat labelled diagrams, wherever necessary.
5. The last columns indicates the Course Outcome.

Marks CO

Question No. 1

- 1 a) Write short notes on Mass density, Weight density, Specific gravity, Viscosity and Explain with neat sketches various conditions of equilibrium related to stability of floating body. (7) 1

Question No. 2

- 2 a) Discuss the differences between the following pairs of concepts: i) Adhesion and Cohesion (8) 1
ii) Newtonian and Non-Newtonian fluids.

and , calculate the capillary effect when a 10 mm glass tube is inserted into a tank containing mercury, given the surface tension of mercury in contact with air is 0.51 N/m. Considering the following contact angles: i) 180° ii) 110°

OR

- 2 b) Discuss the applications of surface tension and the capillarity effect, and derive the equation for the excess pressure inside a water droplet. (8) 1

And, consider the velocity distribution over a plate given by the equation $u = (3/2)y - (1/2)y^2$, where u = velocity in m/s and y = distance from the plate boundary in m. If the viscosity of fluid is 0.8 pa-s. Find the shear stress at the plate boundary and at $y = 0.15$ m from the plate. Use Newton's law of viscosity.

Question No. 3

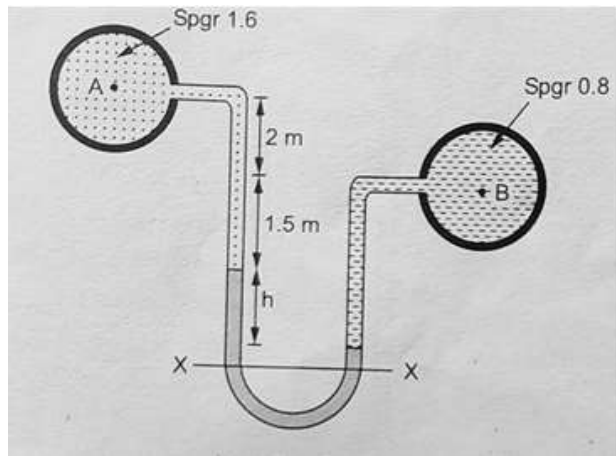
- 3 a) Write short notes on the Reynold's number, Froude's number, dimensional analysis and state the uses and advantages of dimensional analysis. (7) 2

Question No. 4

- 4 a) Explain geometric, kinematic and dynamic similarity. (8) 2

and, A differential manometer is connected at two points A and B of two pipes as shown in Fig. Pipe

pressure at A and B are $11.80 \times 10^4 \text{ N/m}^2$ and $19.60 \times 10^4 \text{ N/m}^2$, find the difference in mercury level in the differential manometer.



OR

- 4 b) b) Explain the working of a U-tube differential manometer, including a neat sketch to illustrate its operation. Additionally, state the following model laws: (8) 2

1) Reynolds' model law

2) Froude's model law

..... End of question paper.....