



**K. K. Wagh Institute of Engineering Education and Research,
Nashik**

(An Autonomous Institute from A. Y. 2022-23)

In-Sem Examination-I, Winter 2023

Exam Seat No.

Academic Year: 2023-2024

Semester: I

Name of Programme: S.Y. B.Tech

Pattern: 2022

Name of Course: Fluid Mechanics

Course Code: CIV222003

Max. Marks: 30*

Duration: 1:00 Hr.

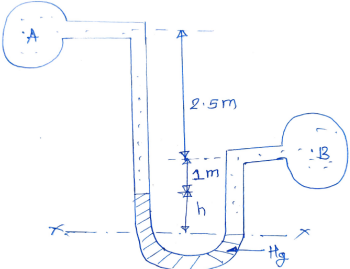
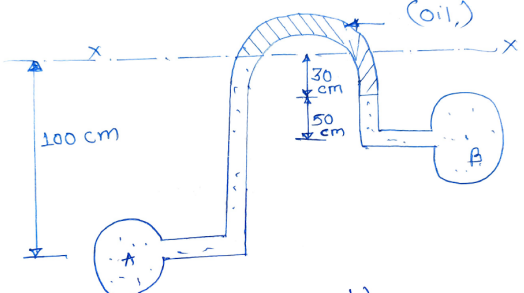
***30 marks will be converted into 20/ 25 marks in proportion.**

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(s) 2 page(s).
- (2) Answer to each new question is to be started on a fresh page.
- (3) Assume suitable data wherever required, but justify it.
- (4) Draw the neat labelled diagrams, wherever necessary.

Q. No.	Details	Max. Marks	CO
Q.1.	a) Calculate the density, specific weight and weight of one litre of petrol of specific gravity=0.7 (5) OR	[15]	CO1
	b) Show the rheological classification of fluids and define each type of fluid giving an example. (5)		
	c) State and explain Newton's law of viscosity (5) OR		CO1
	d) Prove that capillary rise or depression 'h' of a liquid of mass density (ρ) and surface tension (σ) in a tube of diameter 'd' varies inversely with 'd'. (5)		
Q.2	e) A flat plate of area $1.5 \times 10^6 \text{ mm}^2$ is pulled with a speed of 0.4 m/s relative to another plate located at a distance of 0.15mm from it. Find the force required to maintain this speed if the fluid separating them is having viscosity as 1 poise (5) OR	[15]	CO1
	f) The pressure outside the droplet of water of diameter 0.08mm is 11.32 N/cm^2 (atmospheric pressure). Calculate the pressure within the droplet if surface tension is given as 0.0725 N/m of water (5)		
	a) Define Absolute pressure, Gauge pressure, Vacuum pressure, centre of pressure and total pressure (5) OR		CO2
	b) List the various devices used to measure fluid pressure and explain Bourdon tube pressure gauge with a neat sketch. (5)		
	c) A U-tube differential manometer connects two pressures pipe A		CO2



<p>& B. Pipe A contains carbon tetrachloride having a specific gravity 1.594 under a pressure of 11.772 N/cm^2 & Pipe contains oil of specific gravity 0.8 under a pressure of 11.772 N/cm^2. The pipe A lies 2.5m above pipe B. Find the difference of pressure measured by mercury as fluid filling U-tube.</p>  <p style="text-align: center;">Q.2 (c)</p>		
<p style="text-align: right;">(5)</p> <p>OR</p> <p>d) Figure shows an inverted differential manometer connected to two pipes A & B containing water. The fluid in manometer is oil of specific gravity 0.8. For the manometer readings shown in figure. Find the difference of pressure head between A & B.</p>  <p style="text-align: center;">Q.2 (d)</p>		CO2

e) What is dimensional analysis? How it is useful? Explain concept of dimensional analysis. (5)

OR

f) State four model laws and explain any one of them in details. (5)