

Roll No



**PRESIDENCY UNIVERSITY
BENGALURU**

SET A

**SCHOOL OF ENGINEERING
END TERM EXAMINATION - JAN 2024**

Semester : Semester III - 2022
Course Code : CIV2009
Course Name Fluid Mechanics
Program : B.Tech.

Date : 08-JAN-2024
Time : 9:30AM - 12:30 PM
Max Marks : 100
Weightage : 50%

Instructions:

- (i) Read all questions carefully and answer accordingly.
- (ii) Question paper consists of 3 parts.
- (iii) Scientific and non-programmable calculator are permitted.
- (iv) Do not write any information on the question paper other than Roll Number.

PART A

ANSWER ALL THE QUESTIONS

5 X 4M = 20M

1. Differentiate Newtonian fluids and Non-Newtonian fluids with examples
(CO1) [Knowledge]
2. Define Reynold's number and give the classification of fluid flows based on Reynold's number.
(CO2) [Knowledge]
3. The head loss represents the additional height that the fluid needs to be raised by a pump in order to overcome the frictional losses in the pipe. List the minor and major losses of energy in pipes.
(CO3) [Knowledge]
4. Write the Bernoulli's Equation for real fluid and mention any two applications of Bernoulli's equation in the field of flow measurement
(CO2) [Knowledge]
5. State Archimedes' principle with help of one example
(CO1) [Knowledge]

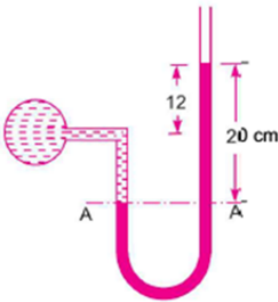
PART B

ANSWER ALL THE QUESTIONS

5 X 10M = 50M

6. Orifice meter is a device used for measuring the rate of flow of a fluid flowing through a pipe. With neat diagram explain the working principle of Orifice meter
(CO2) [Comprehension]

7. The water is flowing through a pipe having diameter 20 cm and 10 cm at sections 1 and 2 respectively. The rate of flow through pipe is 35 litres/sec. the section 1 is 6 m above datum and section 2 is 4 m above datum. If the pressure at section 1 is 39.24 Newton per square centimeter. Find the intensity of pressure at section 2.
(CO2) [Comprehension]
8. A pipe of length 2000m has rate of flow of water through the pipe is 200 litres/sec and head loss due to friction is 4 m. Take the value of $C = 50$ in Chezy's formulae. Find the diameter of a pipe.
(CO3) [Comprehension]
9. The right limb of a simple u tube manometer containing mercury is open to the atmosphere while the left limb is connected to a pipe in which a fluid of specific gravity 0.9 is flowing. The centre of the pipe is 12 cm below the level of mercury in the right limb. Find the pressure of fluid in the pipe if the difference of mercury level in the two limbs is 20 cm.



- (CO1) [Comprehension]
10. Find the Reynolds number if a fluid of viscosity 0.04 Newton sec per square meter and relative density of 850 Kg per cubic meter, flows through a 10 mm diameter pipe with a Velocity of 4.5 m/s? Classify the type of flow based on Reynold's number and show the flow pattern with the help of neat sketch

(CO1) [Comprehension]

PART C

ANSWER ALL THE QUESTIONS

2 X 15M = 30M

11. Three pipes of 400 mm , 200 mm and 300 mm diameters have lengths of 400 m, 200 m and 300 m respectively. They are connected in series to make a compound pipe. The ends of this compound pipe are connected with two tanks whose difference in levels is 16 m. If co-efficient of friction for these pipes is same and equal to 0.005, determine the discharge through the compound pipe neglecting first the minor losses and then including them
(CO3) [Application]
12. Find the head loss due to friction in a pipe of length 50 m and diameter 300 mm, through which water is flow at a velocity of 3 m/s using a) Darcy formula, b) Chezy's formula for which $C = 60$. Take kinematic viscosity of water = 0.01 stoke.

(CO3) [Application]