

Roll No. ....

**24196**

**B. Tech. 4th Semester (Civil)  
Examination – May, 2023**

**FLUID MECHANICS-II**

**Paper : CE-204-F**

*Time : Three hours ]*

*[ Maximum Marks : 100*

*Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.*

*Note : Question No. 1 is compulsory. Attempt total five questions, selecting one question from each Unit. All questions carry equal marks.*

1. Write short notes on : 4 × 5 = 20
- (a) Gradient line.
  - (b) Water Hammer
  - (c) Characteristic curves of Turbine.
  - (d) Manometric Head
  - (e) Surges.

## UNIT – I

2. What do you mean by Prandtl's mixing Length Theory ? Find an expression for shear stress due to Prandtl length theory. 20
3. Determine the wall shearing stress in a pipe of diameter 100 mm which carries water. The velocities at the pipe center and 30 mm from the pipe center are 2 m/s and 1.5 m/s respectively. The flow in pipe is given as turbulent. 20

## UNIT – II

4. A trapezoidal channel has side slopes of 3 horizontal to 4 vertical and slope of its bed is 1 in 2000. Determine the optimum dimensions of the channel, if it to carry water at 0.5 m/s. Take Chezy's constant as 80. 20
5. (a) Derive the condition for the best slope of the most economical trapezoidal channel. 10  
(b) Derive an expression for the discharge through a channel by Chezy's formula. 10

## UNIT – III

6. Describe briefly the function of various main components Pelton turbine with neat sketches. 20
7. (a) How are the drag and lift forces caused on a body immersed in a moving fluid ? 10  
(b) Differentiate between Friction Drag and Pressure Drag. 10

## UNIT – IV

8. A centrifugal pump is to discharge  $0.118 \text{ m}^3/\text{s}$  at a speed of 1450 rpm against a head of 25 m. The impeller diameter is 250 mm, its width at outlet is 50 mm and manometric efficiency is 75%. Determine the vane angle at the outer periphery of the impeller. 20
9. What is a reciprocating pump ? Describe the principle and working of a reciprocating pump with a neat sketch. Why is a reciprocating pump not coupled directly to the motor ? 20