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

FLUID MECHANICS

Paper : PCC-ME-204-G

Time : Three hours]   [Maximum Marks : 75

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

1. (a) Define Pascal's Law.

   (b) Define flow net.

   (c) State Euler's equation and Bernoull's theorem.

   (d) What is the difference between nozzle and diffuser.

   (e) Define hydraulic line and total energy line.

   (f) Define Turbulant flow. $2.5 \times 6 = 15$

UNIT – I

2. Derive the differential equation of continuity in cylindrical co-ordinates.   15

3. Explain the following :   15

   (i) Newton's Law of viscosity

   (ii) Different types of flows

   (iii) Vorticity and circulation

UNIT – II

4. Explain the principle of venturimeter with a neat sketch and establish a relation for the rate of flow through it.   15

5. Explain stagnation properties, isentropic flow and effect of area variation on flow properties.   15

UNIT – III

6. Give a proof of Hagen-Poiseuille equation for fully developed laminar flow in a pipe and hence show that the Darcy-friction coefficient is equal to 16/Re where Re is Reynolds number.   15

7. What are the different types of energy losses occur in pipes. Derive an expression for the loss of head due to friction in pipe.   15

UNIT – IV

8. Explain the following : 15

   (a) Momentum Thickness

   (b) Laminar and turbulent boundary layer flow

9. Explain the following : 15

   (a) Turbulant flow

   (b) Shear stress in turbulant flow, prandte mixing length hypothesis.

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