



B.Tech II Year II Semester Supplementary Examinations, July 2022
Fluid Mechanics and Hydraulic Machines
(Mechanical Engineering)

Maximum Marks: 70

Duration: 3 hours

- Note:
1. This question paper contains two parts A and B.
 2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.
 3. Part B consists of 5 Units. Answer any one full question from each unit.
 4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A

All the following questions carry equal marks

(10x2M=20 Marks)

- 1 What are the physical properties of fluids
- 2 What are the types of Pressures
- 3 Write short notes on lines
- 4 State the Bernoulli's equations
- 5 Write about drag and lift.
- 6 Define Reynold's experiment.
- 7 Write short notes on Pitot tube
- 8 What are the types forces
- 9 Define the term cavitation
- 10 Define the term specific speed

Part-B

Answer All the following questions.

(10M X 5=50Marks)

- 11 Briefly explain the physical properties of fluids with units. 10
OR
- 12 Explain a U-tube manometers with neat sketch and Find out the pressure 10
- 13 Derive Bernoulli's equation from Euler's equations of motions for a stream line. 10
OR
- 14 The water is flowing through a pipe having diameter of 20cm and 10 cm and section 1 and 2 respectively. The rate of flow through the pipe is 35 liters per sec. the section 1 is 6m above the datum line and section 2 is 4m above datum line. If the pressure at section 1 is 39.24N/cm^2 . Find the intensity of pressure at section 2. 10
- 15 a) Describe Boundary Layer Concepts. 5
b) How Reynold's experiment could be useful to fluid Mechanics. 5
OR
- 16 A horizontal venturimeter with inlet and throat diameters 30cm and 15cm respectively is used to measure the flow of water. The reading of differential manometer connected to the inlet and throat is 20cm of mercury. Determine the rate of flow. Take $C_d = 0.98$ 10

- 17 a) Derive the expression for force exerted by the jet on a stationary vertical plate. 5
b) Design Francis Turbine and find out work done and efficiency. 5
OR
- 18 a) Explain with neat sketches of hydroelectric power station 10
b) The hydro power plant has a turbine with the following details. Find the power developed and what is the specific speed of the turbine. Hydraulic efficiency = 90%.
Net head = 65m discharge = $15\text{m}^3/\text{s}$, speed = 100 rpm
- 19 Explain the following terms 10
i). Specific speed, ii). Performance characteristic curves, iii). NPSH.
OR
- 20 A centrifugal pump delivers 25 liters of water per second against a head of 10 meters and running at 1300 rpm requires 10 kW of power. Determine the discharge, head of the pump and power required if the pump runs at 1500 rpm. 10