

19 DEC. 2025 SE CHEMICAL (SEM-III) (NEP-2020) FF QP CODE: 10098708

Time: 2 Hours

Marks: 60

N.B. (1) Question No 1 is compulsory**(2) Attempt any three questions out of remaining five questions****(3) Assumption made, if any should be clearly stated****(4) Figures to the right indicate full marks.**

- Q1 Solve any Three out of Four 15**
- State various pressure measuring devices.
 - Explain Newton's law of viscosity and mention the various units of viscosity.
 - What do you understand by the terms: Major losses and minor energy losses in pipes?
 - Define Manometric Efficiency, Overall Efficiency & Mechanical Efficiency of Centrifugal Pump.
- Q2 10**
- Derive an expression for Bernoulli's theorem from Euler's equation of motion.
 - Explain rheological behavior of fluids with examples and shear stress Vs shear rate diagram. **5**
- Q3 10**
- Explain and derive expression for Pascal's law.
 - The diameter of a pipe at the section 1 and 2 are 15 cm and 20 cm respectively. Find the discharge through the pipe if velocity of water at section 1 is 4 m/s. Determine also the velocity at section 2. **5**
- Q4 10**
- Explain Gate Valve and Globe Valve with neat sketch.
 - Write the difference between Orifice meter and Venturi meter. **5**
- Q5 10**
- Derive an expression for the velocity of sound wave in compressible fluid.
 - The space between two square flat parallel plates is filled with oil having 50 cm side. The upper plate, which moves at 2 m/s requires a force of 98.1 N to maintain the speed. The thickness of oil film is 15 mm. Determine the dynamic viscosity of the oil and also the kinematic viscosity of the oil in stokes if the specific gravity of the oil is 0.96. **5**
- Q6 10**
- Derive an expression for Hagen Poiseuille's equation
 - What is the significance of Mach No.? Also define Mach No. **5**
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