III SEMESTER B.TECH. (CHEM. ENGG.)

MAKE UP SEMESTER EXAMINATION

CHE 2153 MOMENTUM TRANSFER JAN 2023

Type: DES

Q1. Explain the rheological classification of fluids (4)

Q2. Explain the characteristics of turbulence (4)

Q3. Compare and contrast between the terms the drag and drag coefficient (2)

Q4. What is need for correction factors in Bernoulli's equation. Compare the significance of each correction factor (4)

Q5. Find the pressure and density at a height of 7 Kms, if the corresponding values at sea level are 101 KN/m2 and 1.235 Kg/m3 assuming the isothermal conditions. Derive the equation used (4)

Q6. Differentiate between compressible and incompressible fluid (2)

Q7. Derive Darcy's equation and prove that for laminar flow f = 16/NRe using this equation (4)

Q8. Prove that the velocity profile in a steady laminar flow through a circular pipe is parabolic. Oil of viscosity 0.048 kg/m s and density 800 kg/m3 flows through 18mm diameter pipe with the velocity of 0.4 m/s. Calculate the pressure drop in a length of 45m of pipe (3)

Q9. Explain briefly on Moody's and Vonkarmen's charts (3)

Q10. Explain the construction, principle and working of a Pitot tube (3)

Q11. The discharge of water in a pipeline of 10 cms dia is measured by inserting an orifice plate of 5 cms dia. Two pressure gauges fitted upstream and downstream of the plate have shown the readings of 180 kN/m2 and 90kN/m2. Taking the coefficient of 0.625, find the discharge. Derive the equation used here (4)

Q12. Compare and contrast between Fluidized bed and Packed bed (3)

Q13. Derive the equation for Ergun's equation for fluid flow through packed bed. State all the assumptions clearly (4)

Q14. Define Mach Number. Hydrogen gas flows at a velocity of 50 m/s under a pressure of 1.3 bars absolute. If the temperature of the gas is 25°C, at what Mach number does the flow takes place? Assume n=1 for hydrogen gas (3)

Q15. With the neat sketch, explain the principle and working of Reciprocating pump (3)