CENTRAL INSTITUTE OF TECHNOLOGY KOKRAJHAR
(Deemed to be University)
KOKRAJHAR :: BTR :: ASSAM :: 783370

END – SEMESTER EXAMINATION
UG

Session: Jan-June, 2025 Semester: 4th Time: 3Hrs. Full Marks: 100

Course Code: UCE403 Course Title: Hydraulic Engineering

ANSWER ALL QUESTIONS

1. What is the difference between a laminar flow and turbulent flow? What are the characteristics of lamina flow? Enumerate the examples of laminar flow. **4+4+2**

2. A rough pipe is of diameter 8.0 cm. The velocity at a point 3.0 cm from wall is 30% more than the velocity at a point 1 cm from pipe wall. Determine the average height of roughness. **10**

3. A thin plate is moving in still atmospheric air at a velocity of 5 m/s. The length of the plate is 0.6 m and width 0.5 m. Calculate i) thickness of the boundary layer at the end of the plate; ii) drag force on one side of the plate. Take density of air as 1.24 kg/m^3 and kinematic viscosity 0.15 stokes. **20**

4. The ratio of lengths of a submarine and its model is 30:1. The speed of submarine is 10 m/s. The model is to be tested in a wind tunnel. Find the speed of air in wind tunnel. Also determine the ratio of drag (resistance) between model and its prototype. Take the value of kinematic viscosity for sea water and air as 0.012 stokes and 0.016 stokes respectively. The density for sea water and air is given as 1030 Kg/m^3 and 1.24 Kg/m^3 respectively. **20**

5. Find the bed slope of a trapezoidal channel of bed width 6 m depth of water 3 m and side slope of 3 horizontal to 4 vertical, when the discharge through the channel is 30 m^3/s. Take Chezy's constant as 70. **20**

6. Write in details of the following. Draw the figure if necessary. 4*5 = **20**

i. Momentum thickness of boundary layer

ii. Hydraulic jump

iii. Water hammer

iv. Syphon

***