

The Assam Royal Global University, Guwahati

Royal School of Engineering & Technology

B Tech (Civil Engineering), 4th Semester

Semester End Examination, July 2022

Course Title: Hydraulic Engineering

Course Code: CEE022C407

Time: 3 Hours

Maximum Marks: 70

Note: Attempt all questions as per instructions given.

The figures in the right-hand margin indicate marks.

Section – A

1. Attempt all questions. (Maximum word limit 50) 2 x 8
- Discuss few characteristics of specific energy curve.
 - Write the characteristics of turbulent flow.
 - Explain the term momentum thickness.
 - What are the conditions for most economical section of rectangular section.
 - Find the section factor(Z) of a trapezoidal channel whose depth of flow is 1.2m. Bottom width and side slope being 2.2m and 1:2.
 - Give some applications of momentum equation.
 - Differentiate between steady and unsteady flow.
 - Calculate the hydraulic radius of a rectangular channel whose breadth and depth are 2.4m and 1.2m respectively.

Section – B

2. Attempt any one of the following: 12 x 1
- Derive an expression for most economical trapezoidal channel section.
 - List some practical applications of Hydraulic Jump.? Derive an expression for loss of energy and its efficiency in hydraulic jump.
3. Attempt any two of the following: 7 x 2
- Derive an expression for displacement thickness.
 - A fluid of viscosity 8 poise and specific gravity 1.2 is flowing through a circular pipe of diameter 100mm. The maximum shear stress at the pipe wall is 210 N/m². Find
 - The pressure gradient.
 - The average velocity.
 - Derive the expression for force exerted by a jet on stationary plate when the flat plate is held inclined to the jet.
4. Attempt any two of the following: 7 x 2
- Explain the term critical depth with the help of suitable diagrams?
 - A rectangular channel 15m wide discharges water at a normal depth 2.25m. The bed slope is 1 in 4000 and Manning's N =0.018. A dam placed downstream raises the level to a height of the profile to 6.4m immediately behind the dam. Determine the length of profile by single step.
 - What do you mean by undular and weak jump?