Total No. of Questions: 22

Total No. of Pages:02

Roll No. _____

B.Tech IV sem (Main/Back) Exam April-May 2026
Civil Engg.
4CE4-06 Hydraulics Engineering
Paper Code : 4E1316

Time: 3 Hours

Maximum Marks: 70

Attempt all ten questions from Part A, five questions out of seven questions from Part B and three questions out of five questions from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/ calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No.205)

1. _____ 2. _____

Part A (Answer should be given up to 25 words only)

All questions are compulsory

Q.1 What is Reynold's number ?

Q.2 What is boundary layer ?

Q.3 What is specific energy ?

Q.4 What is cavitation ?

Q.5 Explain Darcy's law ?

Q.6 What are the types of pump ?

Q.7 What is transmissivity ?

Q.8 What is unit Hydrograph ?

Q.9 What is Infiltration ?

Q.10 What are the types of canals ?

10 x 2 = 20

Part B (Analytical/Problem solving questions)

Attempt any Five questions

Q.1 Explain the term distorted models and undistorted model. What is the use of distorted models?

Q.2 Obtain expression for the velocity distribution for turbulent flow in smooth pipes.

Q.3 Define the term most economical section of a channel. What are the conditions for the also rectangular channel of the best section.

Q.4 Explain the terms (a) Rabidly varies flow and (b) Gradually varied flow.

Q.5 Find the discharge through a trapezoidal channel of width 6m and side slope of 1 horizontal to 3 vertical. The depth of flow of water is 3m and Chezy's constant C=60. The slope of the bed of the given channel is given 1 in 5000.

Q.6 Obtain the expression for the force exerted by a jet of water on a fixed vertical place in direction of the jet.

Q.7 What is Aquifer also explain various type of aquifer

5x 4 = 20

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Part C (Descriptive/Analytical/Problem Solving/Design question)

Attempt any three questions 1416

Q.1 Using Buckingham's π theorem, show that the velocity through a circular orifice is given by

$$V = \sqrt{2gH}\ \varphi\left[\frac{D}{H}, \frac{\mu}{\rho V H}\right].$$

Where H is the head causing flow, D is the diameter of the orifice, μ is coefficient of viscosity, e is the mass density and g is the acceleration due to gravity.

Q.2 Derive an expression for the variation of depth along the length of the bed of the channel for gradually varied flow in an open channel. State clearly the assumptions made.

Q.3 By applying the momentum equation to open channel flow, show that the sequent depths and flow rate are related by $2q^2/g = y_1 y_2 (y_1 + y_2)$. State the assumptions made is the derivation.

Q.4 Explain Laccy's Regime theory, along with the important terms involved. 1416

Q.5 The ordinates of a 3– hr unit hydrograph of a basin at 6 hr interval are given below.
0,3,5,9,11,7,5,4,2,1,0 cumecs. Derive the storm Hydrograph due to a 3- hr storm with a total rainfall of 15 cm. Assume an initial loss of 0.5 cm and a ϕ index of 1cm/hr. Take base flow = 4 cumecs.

3 x 10= 30

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