

GUJARAT TECHNOLOGICAL UNIVERSITY
BACHELOR OF ENGINEERING – SEMESTER 3 – EXAMINATION – SUMMER 2026

Subject Code: BE03013021

Date: 22/06/2026

Subject Name: BASICS OF ENVIRONMENTAL HYDRAULICS

Time: 02:30 PM TO 05:00 PM

Total Marks: 70

Instructions:

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

- Q.1** (a) Define viscosity and density. 03
(b) Derive relation between dynamic and kinematic viscosity. 04
(c) Explain fluid as continuum and its importance in environmental hydraulics. 07
- Q.2** (a) A fluid has dynamic viscosity 0.9 Ns/m^2 and density 900 kg/m^3 . 03
Find kinematic viscosity.
(b) Differentiate between ideal and real fluids. 04
(c) Explain all properties of fluids in detail with examples. 07
- OR
- Q.2** (c) Explain Newton's law of viscosity. 07
- Q.3** (a) Derive pressure-height relationship. 03
(b) Explain Bernoulli's equation with assumptions and explain its applications. 04
(c) Explain working of venturi meter and pitot tube with diagram. 07
- OR
- Q.3** (a) Define continuity equation. 03
(b) Describe types of flow. 04
(c) Explain measurement of pressure using manometers. 07
- Q.4** (a) Define vena contracta. 03
(b) Explain flow through pipes with losses include HGL & TEL diagram. 04
(c) Derive time of emptying tank through orifice. 07
- OR
- Q.4** (a) Define hydraulic gradient line (HGL). 03
(b) Water flows through a pipe of length = 800 m and diameter = 0.25 m at a discharge of $0.15 \text{ m}^3/\text{s}$. The friction factor $f = 0.02$. Find the head loss due to friction. 04
(c) Explain different types of mouthpieces and discharge equations. 07
- Q.5** (a) Define notch and weir. 03
(b) Water flows over a rectangular notch of width 1 m with head 0.5 m. $C_d = 0.62$. Find discharge. 04
(c) Explain flow through open channel and most efficient section. 07
- OR
- Q.5** (a) What is most efficient section? 03
(b) An orifice of diameter 0.15 m discharges water under a head of 4 m. $C_d = 0.62$. Find discharge. 04

(c) Derive discharge over rectangular weir with velocity of approach.

07
