

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VI (NEW) EXAMINATION – WINTER 2017****Subject Code: 2160602****Date: 08/11/2017****Subject Name: Applied Fluid Mechanics****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.

		MARKS
Q.1	(a) Define: (i) Critical depth (ii) Total energy line (iii) Hydraulic gradient line.	03
	(b) Write a brief note on major and minor losses in pipes.	04
	(c) Derive the Darcy-Weisbach equation for calculating head loss due to friction.	07
Q.2	(a) Describe water hammer phenomenon in pipes.	03
	(b) Prove that for the most economic section of a trapezoidal channel is: “half of the top width is equal to one of the sloping sides”.	04
	(c) Derive the Hagen-Poiseuille equation and state the assumptions made.	07

OR

	(c) A trapezoidal channel with base width 5 m is used to carry a discharge of 30 cumec. The channel has side slopes: 2 horizontal to 1 vertical. If the depth of flow is 1.5 m, determine the Froude number and comment whether the flow is subcritical / critical / super critical flow.	07
Q.3	(a) Explain hydraulically smooth and rough pipes.	03
	(b) Discuss the classification of open channel flow with examples.	04
	(c) What is specific energy? Draw a typical specific energy curve and discuss critical depth and alternate depths.	07

OR

Q.3	(a) Explain briefly Prandtl's mixing layer theory.	03
	(b) Define boundary layer, laminar sub-layer, displacement thickness and momentum thickness.	04
	(c) A pipe system consists of three pipes arranged in series.	07

Sr. No	Pipe	Length (m)	Diameter (cm)
1.	AB	1000	40
2.	BC	2500	30
3.	CD	3000	20

Transform the system to (i) an equivalent length of 30 cm diameter pipe, and (ii) an equivalent diameter for the pipe 6500 m long.

Q.4	(a) What is a hydraulic jump? Discuss the types of jump based on Froude number.	03
	(b) Derive an equation of specific speed of centrifugal pump.	04
	(c) Explain the occurrence and shape of different surface water profiles	07

OR

