Enrollment No: _____ Exam Seat No:_____

C.U.SHAH UNIVERSITY

Winter Examination-2018

Subject Name: Fluid Mechanics - II

Subject Code: 4TE04FLM1 Branch: B.Tech (Civil)

Semester: 4 Date : 23 /10 /2018 Time : 10:30 To 01:30 Marks : 70

Instructions:

(1) Use of Programmable calculator & any other electronic instrument is prohibited.
(2) Instructions written on main answer book are strictly to be obeyed.
(3) Draw neat diagrams and figures (if necessary) at right places.
(4) Assume suitable data if needed.

Q-1 Attempt the following questions: (14)

a) Write the 'Continuity equation' for flow of water through pipe.

b) Define Turbine.

c) Centrifugal pump works on _____ force

d) What is meant by specific energy?

e) List out the fundamental dimension.

f) A line along which the velocity potential is constant is called----------
a) stream line b) Path line c) Equi-potential line d) streak line

g) If an incompressible liquid is continuously flowing through a pipe, the quantity of liquid passing per second is different sections
a) True b) False

h) What is meant by ideal fluid?

i) Write the Chezy's formula for velocity of flow.

j) When hydraulic jump occurs?

k) Write the difference between super critical flow and subcritical flow.

l) The Re is more than 2000 and less than 4000 is called --------- flow

m) Write Bernoulli's equation.

n) Write full form of 'GVF'.

Attempt any four questions from Q-2 to Q-8

Q-2		**Attempt all questions**	**(14)**
	(a)	A fluid flow field is given by $\vec{V} = (x^3y)\,\vec{i} - (2yz - 4t)\,\vec{j} + (y^3z)\vec{k}$. Calculate the acceleration at the point (1, 1, 2) after 2 sec (t =2).	**08**
	(b)	Derive the Bernoulli's equation from Euler's equation of motion.	**06**
Q-3		**Attempt all questions**	**(14)**
	(a)	In a two dimensional flow through a channel, the fluid velocity components are given by u = 2xy + 4x, v = x -4xy. Determine the velocity potential function and stream function	**06**
	(b)	What are the differences between pipe flow and open channel flow?	**04**
	(c)	Explain the uses of flow net.	**04**
Q-4		**Attempt all questions**	**(14)**
	(a)	Find out bed slope of trapezoidal channel of bed width 4 m, depth of water 3m and side slope of 2 horizontal to 3 vertical. When discharge through channel is 25 m3 /sec. Take Manning's Constant N = 0.03.	**06**
	(b)	Write short note on Multistage Centrifugal pump.	**03**
	(c)	A rectangular channel carries a discharge of 18 cumecs with pre-jump depth of 0.9 m. The width of channel is 6m. If the hydraulic jump forms on downstream side calculate the post-jump depth and energy loss.	**05**
Q-5		**Attempt all questions**	**(14)**
	(a)	Explain dimensional homogeneity with suitable example.	**06**
	(b)	Explain Buckingham's method of dimensional analysis	**08**
Q-6		**Attempt all questions**	**(14)**
	(a)	What are the types of similitude? Explain any two of them.	**07**
	(b)	Enlist the forces acting on Fluid in motion.	**04**
	(c)	Explain moody diagram.	**03**
Q-7		**Attempt all questions**	**(14)**
	(a)	An oil of viscosity 0.1Ns/m^2 and relative density 0.9 is flowing through a circular pipe of diameter 50 mm and of length 300 m. The rate of flow of fluid through the pipe is 3.5 l/s. Find the pressure drop in a length of 300 m.	**07**
	(b)	Calculate the critical depth and critical velocity of water flowing in a rectangular channel of width 3.5 m carrying a discharge of 10 m^3/s. Also calculate minimum specific energy.	**07**
Q-8		**Attempt all questions**	**(14)**

(a)	Discuss in detail the working principle of Pelton wheel turbine.	**08**
(b)	Explain in detail the working principle of reciprocating pump with neat sketch.	**06**