Total No. of Questions : 6] **SEAT No. :** [ ]

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Oct.-16/T.E./Insem.-5
T.E. (Civil) (Semester - I)
FLUID MECHANICS - II
(2012 Pattern)

Time : 1 Hour] ***[Max. Marks : 30***

Instructions to the candidates:

1) ***Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right side indicate full marks.***
4) ***Use of logarithmic tables slide rule, Mollier charts, Non programmable electronic pocket calculator and steam tables is allowed.***
5) ***Assume suitable data, if necessary.***

Q1) a) Explain in brief the following terms with neat sketches. **[6]**

i) Karman's vortex street

ii) Polar diagram

b) The water is flowing with a velocity of 1.52 m/s in a pipe of length 2450m and of diameter 500mm. At the end of the pipe, a valve is provided. Find the rise in pressure if the valve is closed in 24 seconds. Take the value of C = 1450m/s. **[4]**

OR

Q2) a) A kite weighing 7.85 N has an effective area of $0.85 m^2$. It is maintained in air at an angle of 11° to the horizontal. The string attached to the kite makes an angle of 46° to the horizontal and at this position the value of co-efficient of drag and lift are 0.61 and 0.79 respectively. Find the speed of the wind and the tension in the string. Take the density of air as 1.245 kg/m^3. **[6]**

b) Define an Unsteady flow. Explain various types of it with suitable example. **[4]**

Q3) a) Explain in brief the following terms with neat sketches : **[4]**

i) Velocity distribution in open channel

ii) Basic governing equations of channel flow

P.T.O.

b) The discharge of water through a rectangular channel of width 8.5m, is 15m^3/s when depth of flow of water is 1.25m. Calculate :

i) specific energy of the flowing water

ii) critical depth and critical velocity

iii) value of minimum specific energy. **[6]**

OR

Q4) a) Explain in brief the following terms with neat sketches : **[6]**

i) Specific energy curve

ii) Channel transitions

b) Find the bed slope of trapezoidal channel of bed width 6.1m, depth of water 3.1m and side slope of 3 horizontal to 4 vertical, when the discharge through the channel is 31 m^3/s. Take Chezy's constant, C = 70. **[4]**

Q5) a) A trapezoidal channel has side slopes of 1 horizontal to 2 vertical and the slope of the bed is 1 in 1400. The area of the section is 41m^2. Find the dimensions of the section it is most economical. Determine the discharge of the most economical section if C = 55. **[5]**

b) Derive the following expression for the depth of hydraulic jump in rectangular channel with usual notations. **[5]**

$$y_2 = -\frac{y_1}{2} + \sqrt{\left(\frac{y_1}{2}\right)^2 + \frac{2q^2}{gy_1}}$$

OR

Q6) a) For discharge of 10 m^3/sec/m and head loss of 20m in hydraulic jump, determine the depths of flow before and after the jump. **[5]**

b) Derive the condition for most efficient triangular channel section. **[5]**