

Total No. of Questions : 6]

SEAT No. :

[Total No. of Pages : 2

P5

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 0.85m². 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/m³. **[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 15m³/s when depth of flow of water is 1.25m. Calculate :
- specific energy of the flowing water
 - critical depth and critical velocity
 - value of minimum specific energy. [6]

OR

- Q4)** a) Explain in brief the following terms with neat sketches : [6]
- Specific energy curve
 - 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 m³/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 41m². 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 m³/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]

