



SE-6741

**B. E. III (Sem. V) (Civil) Examination**  
**April / May – 2011**  
**Hydrology and Open Channel Hydrology**  
**(Old Course)**

Time : 3 Hours]

[Total Marks : 100

**Instructions :**

(1)

नीचे दशांशों में निशानीवाणी विगतो उत्तरवही पर अवश्य लिखनी. Fillup strictly the details of signs on your answer book.		Seat No. :	
Name of the Examination :		<input type="text"/>	
Name of the Subject :		<input type="text"/>	
Subject Code No. : <input type="text"/> 6 <input type="text"/> 7 <input type="text"/> 4 <input type="text"/> 1		Section No. (1, 2,.....) : <input type="text"/> 1, <input type="text"/> 2	
		Student's Signature	

- (2) Attempt all questions.  
(3) Figures to the right indicate full marks.  
(4) Draw neat sketch whenever necessary.  
(5) Assume any data if needed.
- 1 (a) Discuss the importance of hydrology in the design of hydrolic structure. Write the hydrology equation. 8  
(b) Discuss the factors that effect the runoff from a catchment area. 7
- 2 (a) Draw a neat sketch showing the various zones of ground water and point out the importance of a “zone of saturation” in this connection. 7  
(b) Discuss the limitation of unit hydrograph. 7  
Explain step by step the method of construction of unit hydrograph from a storm hydrograph.

**OR**

- (b) The ordinate of a 3hr unit hydrograph are given below. 7

Time (mm)	0	3	6	9	12	15	18	21
3hr (unit hydrograph ordinate cumecs ( $m^3 / ses$ ))	0	20	47	62	35	15	5	0

Find the ordinate of 6 hr unit hydrograph for the same catchment area. Plot the unit hydrograph.

- 3** Attempt any three : **7×3=21**
- (i) Define stream gauging. Explain how the discharge can be measured by area-utility method using current meter.
  - (ii) Explain the component parts of a hydrological cycle with a neat sketch.
  - (iii) Derive an expression for determining the discharge from a confined aquifer under equilibrium condition.
  - (iv) Discuss the different types of precipitation. Draw sketch where necessary.
  - (v) Describe the different methods of finding average precipitation over a basin.
- 4**
- (a) Derive the conditions for maximum discharge for channel of triangular section. **6**
  - (b) Explain various types of draw down curves and mention the condition and controls required to produce them. **6**
  - (c) Water flows uniformly at a depth of 2.5 meters in a rectangular canal 3.0 meters wide laid on a slope of 1 metre per 1000 metre. What is the mean stress at the bottom of the canal based on the Reynold's and Froude's number, determine the type of flow in the canal. Take  $C = 50$  and kinematic viscosity of water as  $10^{-6} \text{ m}^2/\text{s}$ . **6**
- 5**
- (a) Define specific energy and draw and explain specific energy curve in detail for non-uniform flow in channel. **9**
  - (b) A sluice gate discharges water into a horizontal rectangular channel with a velocity of 15 m/s and depth of flow of 1.5 metre. Determine the depth of flow after the jump and consequent loss in total head. **8**
- OR**
- (a) Show that for most economical trapezoidal channel
    - (i) half of top width = one of the sloping sides of the channel **10**
    - (ii) hydraulic mean depth = half of depth of flow.
  - (b) Give classification of open channel flow in detail. **5**
- 6** Write any **three** : **15**
- (i) Flood routing
  - (ii) Critical velocity
  - (iii) Classification of channel slopes
  - (iv) Hydraulic jump and its applications
  - (v) Back water curve.