B.Tech. Civil (Construction Management)

02686

Term-End Examination

June, 2011

ET-540(B) : FLOW IN OPEN CHANNEL

Time : 3 hours   *Maximum Marks : 70*

Note :   *Answer **any five** questions. All questions carry equal marks. Give neat and well labelled sketches. Use of calculator is permitted.*

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1. (a)   Calculate the hydraulic mean depth, top   9
         width, and section factor for the following
         channel.

         A trapezoidal section ($b = 3.0$m, $z = 1$)
         carries a flow at a depth of 1.25 m, when its
         bed slope is 0.0004 and $n = 0.035$

    (b)   Compute the discharge of channel in (a)   5
         above.

2. (a)   A 6 m. wide rectangular channel carries a   12
         flow of 12 m^3/s at a depth of 1.0m.
         Calculate :

         (i)   E   (ii) Y_c
         (iii) V_c (iv) E_c

    (b)   Considering y and y_c, determine whether   2
         the channel is steep or mild.

3. (a) Sketch out a hydraulic jump formed on a   6
       horizontal bed of a rectangular channel
       showing sequent depths and energy lines.

   (b) If a rectangular channel has an energy loss   8
       of 6.25 m through a jump in the flow while
       the shooting flow has $F = 9$, find the sequent
       depth.

4. (a) Sketch out practical situation of flow that   12
       develop : M_1 ; M_2 ; M_3 ; S_1 ; S_2 ; and S_3
       profiles, giving various zones and the profile
       shapes.

   (b) How are rapidly varied flows different from   2
       gradually varied flows ?

5. (a) Name various gradually varied flow   4
       computational procedures.

   (b) Describe any one method of G.V.F.   10
       computations in detail.

6. (a) Derive the expressions that define Reynolds   7
       and Froude numbers.

   (b) What is the significance of these numbers   7
       in open channel flow ?

7. Write short notes on *any four* of the following.

   (a) Pressure distribution in an open channel
       flow with concave and convex bed profiles

   (b) Critical flow and critical slope $4 \times 3\frac{1}{2} = 14$

   (c) Dimensions of n and c

   (d) Hydraulic exponent

   (e) Resistance to flow.

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