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ET-540(B)

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B.Tech. Civil (Construction Management)

Term-End Examination

December, 2010

ET-540(B) : FLOW IN OPEN CHANNEL

Time : 3 hours *Maximum Marks : 70*

Note : *(i) Answer any five questions.*

(ii) Give neat, Labelled sketches when necessary.

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1. Sketch the water surface profiles for the following:

   (a) (i) M_3 -profile down stream of a sluice gate **11**

   (ii) C_1- profile on a critical - slope channel -indicate also the practical conditions that give rise to it.

   (iii) S_3 - profile on a steep channel indicating the practical conditions responsible for it to occur.

   (b) Profile at the end of a mild-slope that ends in an abrupt fall. Indicate the position of y_c on it. **3**

2. A trapezoidal channel (b=2m; z=1) has a bed slope of 0.00015, and n=0.013, and carries $Q = 3.Nm^3/s$. Find the normal depth flow. **14**

3. (a) A long rectangular channel (b=14.00m) has a bed slope of 0.00012, that connects two reservoirs of water. The depth of water at the u/s reservoir is 1.75 m, while the level in d/s reservoir is much that it gives a depth of 2.2m. Determine what type of water surface can form in the channel. Take n=0.014. 10

(b) For an open channel carrying water at V=3.5m/s, the area of flow is 9.75 m^2 with P= 8.20m taking n=0.014, find S_f. 4

4. (a) Describe how you would locate a jump at the junction of a steep channel with a mild channel. 5

(b) Differentiate between hydraulic depth and hydraulic radius. When are the two equal to each other ? 5

(c) How does the pressure along the depth of flow vary for a concave bed open channel? 4

5. Discuss the standard-step method, and Direct Integration method of determining water-surface profile of an open channel. Give tables and explain the calculations. (07,07)

6. Discuss and explain the following :- 14

(i) Specific energy, and its variation with y.

(ii) Momentum principle

(iii) Velocity distribution over different cross sectional shapes of an open channel

7. Write short notes on ***any four*** of the following : **14**

(i) Dimensionless curves used in finding y_n for a given section factor

(ii) Geometric elements of an open channel

(iii) Waves in a water body

(iv) Fronde Number, and Reynolds Number

(v) Steady and insteady flows

(vi) Use of section Factor in open channel calculations, other than finding y_n.
