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ET-540(B)

B.Tech. Civil (Construction Management)

Term-End Examination

December, 2018

00073

ET-540(B) : FLOW IN OPEN CHANNEL

Time : 3 hours *Maximum Marks : 70*

Note : *Answer any **five** questions. All questions carry equal marks. Use of scientific calculator is permitted.*

1. (a) Define and differentiate between the following : *8*

(i) Uniform flow and Varied flow

(ii) Steady flow and Unsteady flow

(b) Define hydraulic grade line and energy grade line. With the help of a neat sketch, show hydraulic grade line and energy grade line for pipe flow. *6*

2. (a) With the help of neat sketches, explain the velocity distribution in the following types of open channels : *9*

(i) Rectangular channel

(ii) Trapezoidal channel

(iii) Triangular channel

(b) A trapezoidal channel is having bottom width of 3·0 m, side slope 1·5 : 1, longitudinal slope of 0·0015 and n = 0·013. Find the normal discharge, if the normal depth of flow is 2·0 m. 5

3. (a) Discuss the application of specific energy principle to solve the transition problem. 7

(b) A rectangular channel expands smoothly from a width of 1·5 m to 3·0 m. Upstream of the expansion the depth of flow is 1·8 m and the velocity of flow is 2·0 m/s. Find the depth of flow after expansion. 7

4. (a) What is hydraulic jump ? Mention the applications of hydraulic jump. 7

(b) Water flows in a horizontal channel with a velocity of 8·0 m/s at a depth of 1·0 m. Find the conjugate depth and the energy loss in the jump. 7

5. (a) Define gradually varied flow. Write the assumptions made for deriving dynamic equation of gradually varied flow. 7

(b) With the help of neat sketches, discuss the practical situations for occurrence of M-flow profiles. 7

6. (a) Identify and draw flow profiles for the following situations : 7

(i) A mild channel breaking into a steep channel

(ii) An adverse channel discharging into a mild channel

(b) Describe the method of direct integration (Bresse's method) of computation of flow profile. 7

7. Write short notes on any ***four*** of the following : $4 \times 3\frac{1}{2} = 14$

(a) Control Section

(b) Reynolds Number

(c) Manning's Equation

(d) Hydraulic Exponent for a Prismatic Channel

(e) Relationship between Manning's 'n' and Chezy's 'C'