

**B.Tech. Civil (Water Resources Engineering)**

**Term-End Examination**

**June, 2015**

00100

**ET-536(B) : HYDRAULIC STRUCTURES – II**

*Time : 3 hours*

*Maximum Marks : 70*

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*Note : Attempt any five questions. All questions carry equal marks. Use of non-programmable calculator only is allowed.*

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1. (a) Distinguish between main canal, branches, distributaries and minors. Give standard cross-sections of these canals. 7
- (b) Discuss the type of failures that can possibly occur in cut and filled slopes. Why are side slopes in a channel different in cutting and in embankment ? 7
2. (a) How do syphon aqueducts differ from ordinary aqueducts ? Discuss their mechanics of flow with suitable sketches. 7

- (b) Bring out the limitations of Kennedy's and Lacey's silt theories and explain their implications. Design an irrigation channel to supply 50 cumecs of water by Lacey's method assuming silt factor of 1.0. 7
3. (a) Design a concrete lined channel having a trapezoidal section for the following data : 7
- Discharge = 30 cumecs
  - Bed slope = 1 in 9000
  - Side slope of channel = 1.25 H : 1.00 V
  - Depth of channel is restricted to 4 m
  - Adopt Manning's  $n = 0.012$ .
- (b) How do you select the type of a module for an outlet ? Discuss in detail with reference to every related factor. 7
4. (a) Suggest various measures to control and remove silt from a water course. Why do weeds need to be removed ? How can you control weeds on a water course ? 7
- (b) What are the various types of cisterns ? Which is the most efficient type for energy dissipation ? 7

5. (a) What do you mean by canal fall ? What are the various types of falls commonly adopted on canals ? Discuss the suitability of each type. 7

(b) How would you orient a canal offtake to minimize silt entry into the canal ? How can you introduce a favourable curvature at a barrage site to minimize silt entry into the canal ? 7

6. (a) What are the objectives of river-training ? What particular river-training measures are required for the following ? Explain in brief. 7

(i) Guiding the flow near hydraulic structures

(ii) Flood protection

(iii) Navigation

(iv) Sediment control

(b) What is meant by high water river-training ? Discuss the overall schemes with reference to a practical situation. 7

7. (a) What are the advantages of inland navigation ? Why is river improvement required for navigation ? 7
- (b) How can river channels be improved for navigation ? Explain the answer with suitable sketches. What is a navigation lock ? 7
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