

B.Tech. Civil (Water Resources Engineering)

00012 **Term-End Examination**
December, 2016

ET-536(B) : HYDRAULIC STRUCTURES – II

Time : 3 hours

Maximum Marks : 70

Note : *Attempt any five questions. All questions carry equal marks. Support your answers with examples and neat diagrams, wherever necessary. Use of scientific calculator is permitted. Assume appropriate data, if not given.*

1. (a) How can an irrigation canal be utilized to develop hydroelectric power ? What are the requisite features of the area that must exist for this purpose ? 7
- (b) Explain the effect of cross-drainage works on canal alignment. 7
2. (a) Explain how you will determine the following while designing a siphon aqueduct : 3×2=6
 - (i) Water ways of the drain and cross-sectional area of the barrel
 - (ii) Head loss through the siphon barrel
 - (iii) Uplift pressure due to seepage flow
- (b) Explain the design of an unlined channel by Lacey's theory. 8

3. (a) What are the various types of falls commonly adopted on canals ? Discuss the suitability of each type. 7
- (b) What are the parameters that influence silt charge in flowing water, and why should silt be controlled at the headworks ? 7
4. (a) An irrigation canal has been constructed with the following parameters :
- (i) Full Supply Discharge = 45 cumec
 - (ii) Bed Width = 30 m
 - (iii) Depth = 1.8 m
 - (iv) Side Slope = $\frac{1}{2} : 1$
 - (v) Bed Slope = 1 in 6600
 - (vi) Manning's N = 0.0225
 - (vii) Critical Velocity Ratio = 1
- Check whether the section designed satisfies Kennedy's theory. 9
- (b) Discuss the design requirement of a good outlet. 5
5. (a) What is meant by the flexibility of a distribution system ? Give practical examples. 7
- (b) Describe the measures of controlling floods. Give examples with sketches from real field situations. 7

6. (a) What is the necessity of river training works ? Explain meandering of rivers and the factors upon which it depends. $2+5=7$
- (b) What is a guide bank or Bell's bund ? Draw a neat sketch of a guide bank and explain its different parts. $2+5=7$
7. Differentiate between the following : $4 \times 3 \frac{1}{2} = 14$
- (a) Alluvial and Non-alluvial Canals
- (b) Super Passage and Aqueduct
- (c) Control Structures and Cisterns
- (d) Hyper Proportional and Sub-proportional Outlets
8. Write short notes on any *four* of the following : $4 \times 3 \frac{1}{2} = 14$
- (a) Conveyance and Distribution Canal
- (b) Rugosity Coefficient
- (c) Distributary Head Regulator and Canal Head Regulator
- (d) Silt Ejectors
- (e) Warabandi
- (f) Spurs
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