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## H155

### B. Tech. EXAMINATION, 2020

(Eighth Semester)

(B Scheme) (Re-appear Only)

CE496B

BRIDGE ENGINEERING

*Time : 2½ Hours]*

*[Maximum Marks : 75*

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Before answering the question-paper candidates should ensure that they have been supplied to correct and complete question-paper. No complaint, in this regard, will be entertained after the examination.

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**Note :** Attempt *Four* questions in all. All questions carry equal marks. Assume any data if missing in the question paper. Indian Standard codes are allowed.

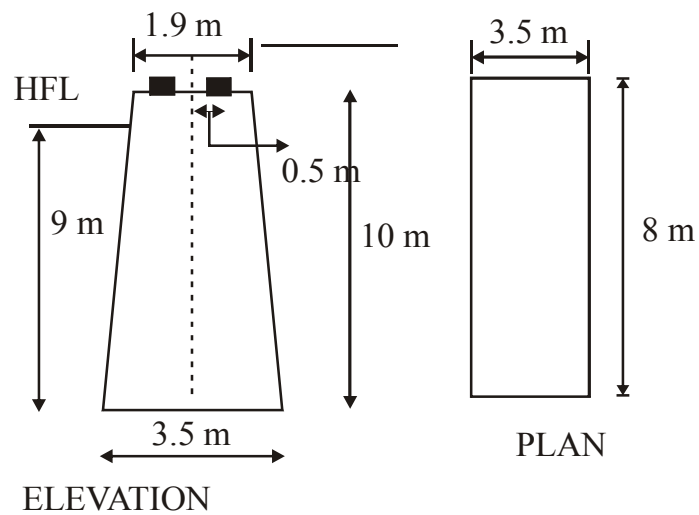
(3)M-H155

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1. (a) How do hydraulic factors influence the design of bridges ?  
(b) What is an envelope curve ? How is it useful in estimation of maximum flood discharge ?  
(c) How do you estimate the normal scour depth of a quasi-alluvial stream ? Derive the respective equations subjected to different constraints.
  
2. Design a slab culvert for the following data :  
Culvert to be on State highways, clear span 6.7 m; 0.75 m footpath on either sides; condition of expose moderate; depth of foundation 1.75 m; wearing course 75 mm thick asphaltic concrete; concret M35; steel used is Fe500. Live load is considered due to class AA wheeled vehicle.

3. Design a T-beam superstructure for a bridge on a national highway. The following details are available :  
Effective Span : 16 m  
Live load : IRC Class AA (wheeled type)  
Material : M30 Concrete and Fe415 steel.  
Spacing of cross girders : 2.75 m  
Sketch the reinforcement details in the components parts of the deck.
  
4. Design the longitudinal girder of the RCC T-beam bridge for the following data :  
clear roadway = 7.5 m; assume T beams spaced at 2.75 m intervals; effective span of T-beam bridge = 12 m; Live Load-Class AA tracked; thickness of wearing coat is 100 mm; Use M35 concrete and Fe500 steel. Using Courbon's method, compute the design moments and shears and design the main girder and cross girder and sketch the reinforcement in detail.

5. What are the different types of steel bridges ?  
Classify them with their neat sketches. Explain the factors considered in designing the cable stayed bridge.
6. Design a pier for the following data :  
Superstructure : simply supported T-beam of 21.3 m span  
Foundation : well foundation  
Dimensions : as shown in figure  
Dead load from each span = 3500 kN  
Reaction due to live load on one span = 2000 kN, Braking forces = 165 kN  
Max. mean velocity of mean current = 3.5 m/sec  
M30 concrete and Fe500 steel.  
Live load : IRC class AA tracked vehicle :



7. What are the different types of bearings ? Explain sliding plate, Steel Rocker and R.C. hinge (rocker) bearings in detail along with sketch.
8. What are the precautions that are considered during the construction of a bridge ? How inspection of a bridge is done at large scale ?