

**M.E. DEGREE EXAMINATIONS: NOVEMBER 2009**

Third Semester

**STRUCTURAL ENGINEERING**

P07SEE04 Design of Bridges

**Time: Three Hours**

**Maximum Marks: 100**

Use of relevant codes permitted  
Assume suitable data wherever necessary

**Answer ALL Questions:-**

**PART A (10 x 2 = 20 Marks)**

1. What is meant by economical span of a bridge?
2. What are the forces to be considered in the design of bridges?
3. List the rational methods followed to estimate the distribution of live loads among the longitudinal girders
4. What is meant by effective width of dispersion?
5. Under what circumstances the box girder bridge is preferred?
6. What is meant by articulation?
7. List the special features of PSC against RCC
8. Define the term: Pre tensioned PSC bridges
9. What are the basic functions of an abutment?
10. What are the main functions of bearings?

**PART B (5 x 16 = 80 Marks)**

11. a) (i) Describe the various investigations of major bridges.  
(ii) Explain the factors influencing the choice of the type of bridge.  
**(OR)**  
b) (i) Describe the IRC standard loadings and indicate the conditions under which each should be used.  
(ii) What are the general design considerations? Explain briefly.
12. a) RCC deck slab bridge is to be constructed over a clear span of 5.5 m. The following details are available. Design the slab bridge.

Width of foot path: 1m on either side.

Wearing coat : 100 mm thick

Loading : IRC Class AA tracked vehicle

Materials : M 25 concrete and Fe 415 steel

**(OR)**

- b) Obtain the values of short span and long span bending moment in case of an interior panel of a T beam bridge having the following data:

Dimensions of the panel : 3 m x 3.5 m

Loading : IRC class A

Loading pattern : (i) Two wheels (each 57 kN) adjusted symmetrically with respect to the slab panel.  
(ii) One wheel (57 kN) at centre of the panel.

13. a) (i) What are the advantages and disadvantages of RC continuous girder bridges over simply supported bridges?  
(ii) Give the step by step procedure of design of continuous bridges.

**(OR)**

- b) (i) Describe briefly the use and advantages of a balanced cantilever bridges.  
(ii) Write a note on preliminary design and analysis of box girder bridges.

14. a) Describe briefly the advantages of pre stressed concrete bridges over RCC bridges and give the design steps for PSC bridges.

**(OR)**

- b) Explain briefly the principles of design of the following components of a post tensioned PSC bridges.  
i) Mid-span section of the girder  
ii) End block of the girder

15. a) (i) What are the factors to be considered while selecting a bearing?  
(ii) Design a mild steel rocker bearing for transmitting the super Structure reactive load of 1200 k N.

**(OR)**

- b) (i) Write a note on stability analysis of abutments:  
(ii) State the principles of design of pile foundation for a bridge pier.

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