

Roll No.

Total Pages : 3

BT-8/M-20

38042

BRIDGE ENGINEERING

Paper–CE-402-E

Time Allowed : 3 Hours]

[Maximum Marks : 100

Note : Attempt **five** questions in all, selecting at least **one** question from each Unit. All questions carry equal marks. Assume any data suitably if missing and state clearly. Use of IS456 : 2000 and IRC codes are allowed.

UNIT-I

1. (a) Explain the IRC class AA track and vehicle loading along with dimensions and appropriate sketches. 10
- (b) Define Bridge. Discuss the characteristics of ideal side for a bridge. Also write the various components of bridge. 10
2. (a) Explain in detail various loads to be considered for the design of bridge. 10
- (b) What is 'Economical span'? Derive an expression for most economical span along its assumptions. 10

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UNIT-II

3. Design a reinforced concrete slab culvert for a National Highway to suit the following data :
- Carriage way = 7.5m wide
- Clear span = 6m
- Wearing coat = 80mm
- Width of bearing = 0.4m.
- Use M_{25} and Fe 415. Design the RC deck slab for IRC class AA loading and sketch the reinforcement details in Longitudinal and Cross-section. 20
4. Discuss the various types of RCC bridges commonly used. Also describe step by step design procedure of T-beam bridge. 20

UNIT-III

5. (a) What are the various types of steel bridges? Give the brief description of each. 10
- (b) Discuss the design procedure of plate girder bridges. 10
6. Design a steel trussed bridge to suit the following data : 20
- Effective span = 20 m
- Roadways : 7.5m (two lane)

Kerbs : 600 mm

Loading : IRC Class AA tracked vehicle.

Materials : M_{25} and Fe 415 for deck slab.

UNIT-IV

7. (a) Define piers and abutments. List the various forces and stresses considered for the design of piers and abutments. 10
- (b) What are the various types of foundations provided for the bridges? Explain any one type in detail. 10
8. (a) Discuss the functions of staging and curb in a well foundation. 5
- (b) Discuss the functions of bearings. 5
- (c) What are the various joints provided in the bridge? 5
- (d) Approaches and wing wall. 5