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Question Paper Code : 11824

M.E. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2014.

Elective

Structural Engineering

ST 9252/ST 952 — DESIGN OF BRIDGES

(Regulation 2009)

Time : Three hours

Maximum : 100 marks

Use of relevant BIS, IRC and Pigeaud's curves is permitted.

Assume any required data suitably.

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is known as "Economic Span"?
2. How will you consider impact effect for IRC class A loading?
3. What is the limitation of Pigeaud's curves?
4. What are the assumptions' in Courbon's theory?
5. What are the advantages of continuous bridges?
6. What is called articulation?
7. Give the typical cross sections of post tensioned prestressed concrete bridge deck.
8. Define end block.
9. What are the forces acting on a pier?
10. Classify the expansion type bearings.

PART B — (5 × 16 = 80 marks)

11. (a) Explain the IRC classifications of different types of loadings of highway bridges.

Or

- (b) Classify the types of bridges and mention the choice of selection of type of bridges for different situations.

12. (a) Design the deck slab for a slab culvert with following details.
 Culvert to be on SH
 Width of bridge: 12m
 No footpath provided
 Materials: M₂₅ and steel — deformed bars (Fe.415)
 Clear span: 5m
 Wearing course: 56mm thick
 Design load: DRC class AA tracked
 Other data can be assumed suitably.
 Or
- (b) Design a interior slab panels for a R.C.C 't' beam girder bridge with following details.
 Clear width of roadway = 7.5m
 Span (c/c of bearings) = 16m
 Live load: DRC class AA tracked vehicle
 Thickness of Wearing Course = 80mm
 Materials = M₂₅ and Fe 415 HYSD bars
 Other data can be assumed suitably.
13. (a) Write the step by step procedure for design of a long span continuous bridge.
 Or
- (b) Sketch the typical cross section of a box girder highway bridge. When will you choose this type of bridge?
14. (a) Explain the special features of prestressed concrete bridges as compared to normal R.C. bridges with an example.
 Or
- (b) Describe briefly the design steps for the prestressed concrete girder.
15. (a) Explain the different types bearing used in bridge structures with neat sketches.
 Or
- (b) Verify the adequacy of the dimensions for the pier with the following details:
- | | | |
|-------------------|---|--|
| Top width of pier | : | 1.2 m |
| Side batter | : | 1 in 10 |
| High flood level | : | 1.5 m below bearing level |
| Span of bridge | : | 12 m |
| Loading | : | IRC Class AA |
| Road | : | Two lane road with 1 m wide footpath on either side |
| Super structure | : | Consists of 3 longitudinal girders of 1.2 depth with a deck slab of 200 mm depth |
| Rib of girder | : | 300 mm |
| Material of pier | : | M 30 |