G 1628   (Pages : 2)   Reg. No............................

Name................................

B.TECH. DEGREE EXAMINATION, MAY 2015

Eighth Semester

Branch : Civil Engineering

CE 010 801—ADVANCED STRUCTURAL DESIGN (CE)

(New Scheme—2010 Admission onwards)

[Regular/Supplementary]

Time : Three Hours   Maximum : 100 Marks

Part A

Answer all questions.
Each question carries 3 marks.

1. List the loads to be considered in the design of Road Bridge.

2. What is the difference between long and short shells ?

3. What are the different types of truss ?

4. Write a note on gantry girder.

5. How impact factor is considered in the design of road bridge ?

(5 × 3 = 15 marks)

Part B

Answer all questions.
Each question carries 5 marks.

6. List the factors to be considered while selecting bearings for bridges.

7. What is membrane theory of shells ?

8. Explain the design procedure of a purlin.

9. Explain the elements of a plate girder with a neat sketch.

10. What is box culvert ?

(5 × 5 = 25 marks)

Part C

Answer all questions.
Each question carries 12 marks.

11. Design a box culvert using the following data. Width of carriageway = 7.5m. footpath on either side is 0.7m width, span = 4m, height of the vent = 2.5 m. Use M25 concrete and Fe415 steel.

Or

Turn over

12. Design the interior slab panel of a T-beam slab bridge, 5.5 m wide between the two main T-beams and 4 m long between the cross girders. Carriageway width is 7 m and kerbs of 700 mm wide are provided. Use IRC Class AA loading. Adopt M20 concrete and Fe415 steel bars. Sketch the reinforcement details.

13. Design a simply supported cylindrical shell roof with the following details. Radius of the shell is 6m and span is 20 m and the thickness of the shell is 60 mm. Take live load of 2 kN/m^2. Use M 20 concrete and Fe415 steel. Sketch the details.

Or

14. Design a reinforced concrete shell with a circular directrix with the following dimensions. Distance between the traverse is 40 m, Radius of shell is 6m, and thickness of shell is 40 mm and semi central angle is 60 degree. L.L is 200 N/mm^2. Use M20 concrete and Fe415 steel.

15. Design a pratt type roof truss for an industrial building given the following data. Overall length is 40m, overall width is 16 m, width of c/c of roof columns is 14 m, height of column is 10 m, roofing material is asbestos cement sheets. The industrial building is situated in Agra.

Or

16. The trusses for a factory building located at Bhopal are spaced at 6m c/c and the purling are spaced at 1.5 m c/c. The pitch of the truss is 28° and the span of the truss is 16 m. The roof consists of asbestos sheets with weight 15 kN/m^2. Design : (i) suitable I section purling ; and (ii) angle section purling and properly sketch the connections with ACC sheets to purling.

17. Explain the design procedure of a gantry girder.

Or

18. Design a plate girder of 20 m span, using the tension field action for the following factored forces. Maximum moment Mz = 5000 kNm, Maximum shear force = 900 kN. The girder is laterally restrained. Connections need to be designed.

19. The effective span of a through type plate girder two lane bridge is 30 m. the reinforced concrete slab is 250 mm thick inclusive of wearing coat. The footpaths are provided on their sides of carriageway. The cross girder are provided at 3 m center. The stringers are spaced at 2.45 m c/c. the spacing between the main girder is 9.80 m. Determine the maximum sections for the stringers, if bridge is to carry IRC class A standard loading.

Or

20. In a plate girder through type bridge carrying a single broad gauge track, the cross girder are provided at 4m centers. The stringers are spaced 2 m from c/c. Using the data given below, design the cross girders.

Spacing between the main girder   = 4 m

EUDLL for 4m for BM per track   = 592 kN

EUDLL for 4m for shear per track   = 788 kN

(5 × 12 = 60 marks)