

F 3218

(Pages : 3)

Reg. No.....

Name.....

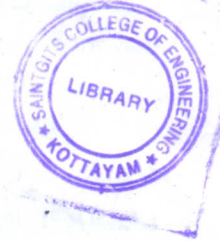
B.TECH. DEGREE EXAMINATION, NOVEMBER 2014

Eighth Semester

Branch : Civil Engineering

CE 010 801—ADVANCED STRUCTURAL DESIGN (CE)

(New Scheme—2010 Admission / Supplementary)



Time : Three Hours

Maximum : 100 Marks

Part A

Answer all questions.

Each question carries 3 marks.

1. How is impact factor considered in the design of bridge ?
2. Sketch four typical shapes of folded plate roofs.
3. What are the elements of an industrial building ?
4. Write a note on plate girder bridges.
5. Write a short note on IRC class B loading.

(5 × 3 = 15 marks)

Part B

Answer all questions.

Each question carries 5 marks.

6. Write the classification of IRC loading.
7. What is membrane theory of shells ?
8. Write the design principles for gantry Girder Bridge.
9. Explain the elements of a plate girder with a neat sketch.
10. List the various types of roof trusses and give the span ranges for them.

(5 × 5 = 25 marks)

Part C

Answer all questions.

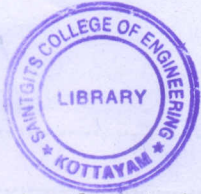
Each question carries 12 marks.

11. Design a box culvert using the following data Width of carriage way=6.5m, footpath on either side is 0.7m width, span=4m, height of the vent=3m. Use M20 concrete and Fe415 steel.

(12 marks)

Or

Turn over



12. Design the interior slab panel of a T-beam slab bridge, 3.5 m wide between the two main T-beams and 4 m long between the cross girders. Carriage way width is 6 m and kerbs of 600mm wide are provided. Use IRC Class AA loading. Adopt M20 concrete and Fe415 steel bars. Sketch the reinforcement details.

(12 marks)

13. Design a simply supported cylindrical shell roof with the following details. Radius of the shell is 7m and span is 25 m and the thickness of the shell is 60mm. Take live load of 2kN/m^2 . Use M 20 concrete and Fe415 steel. Sketch the details.

(12 marks)

Or

14. Design a reinforced concrete shell with a circular directrix with the following dimensions. Distance between the traverse is 300 m, Radius of shell is 4 m, and thickness of shell is 60 mm and semi central angle is 60 degree. L.L is 200N/mm^2 . Use M20 concrete and Fe415 steel.

(12 marks)

15. Design a fink type roof truss for an industrial building given the following data. Overall length is 45m, overall width is 18 m, width of c/c of roof columns is 16m, height of column is 10 m, roofing material is asbestos cement sheets. The industrial building is situated in Mumbai.

(12 marks)

Or

16. The trusses for a factory building located at Bhopal are spaced at 7m 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 18 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.

(12marks)

17. Design a gantry girder to be used in an industrial building carrying an electric overhead travelling crane for the following data.

Crane capacity–250kN.

Self weight of the crane girder excluding trolley–300kN .

Self weight of the trolley, electric motor, hook, etc.–50 kN.

Approximate the minimum approach of the crane hook to the gantry girder–1.20m.

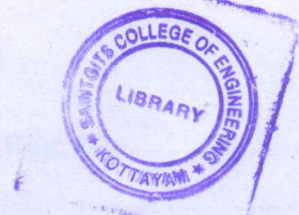
Wheel base–3.5m.

C/C distance between gantry rails–18m.

C/C distance between columns (span of gantry girder) -6m Self- weight of rail section –400N/m

Yield stress of steel– 250N/mm^2 .

(12 marks)



18. Design a plate girder, 22 m span, to be provided in a hall of a restaurant. The superimposed, exclusive self weight is 200 kN/m. Design the web splice at one-third of span and flange splice at one-fourth of the span.

(12 marks)

19. The effective span of a deck type plate girder highway bridge is 25m. The width of carriage way is 8.5m with 1m wide footpaths on either side. The 3 main girders are spaced at 2.5m c/c. The cross girders are provided at 4m c/c. The deck slab is 200mm thick RCC. The bridge has to be designed for IRS class A Loading.

(12 marks)

Or

20. A deck type plate girder railway bridge is to be constructed for a broad gauge single line track on the main line. The following data is available :

Effective span = 18m.

C/C distance between plate girders=2.5m.

Dead load on each girder=600 N/m.

Dead load of track with sleepers=6800N/m.

Lateral load=9000N/m.

Design the super structure of the bridge.

(12 marks)

[5 × 12 = 60 marks]

Turn over