G 979 (Pages : 3) Reg. No................................

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B.TECH. DEGREE EXAMINATION, MAY 2014

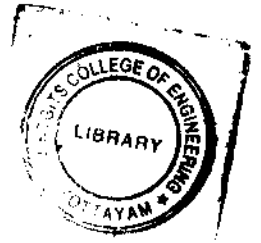### Eighth Semester

Branch : Civil Engineering

CE 010 801 – ADVANCED STRUCTURAL DESIGN (CE)

(New Scheme—2010 Admissions)

[Regular]

Time : Three Hours   Maximum : 100 Marks

Part A

Answer all questions.

Each question carries 3 marks.

1. Write a note on impact factor of bridge.

2. What are the characteristics of folded plates?

3. What are the elements of an industrial building?

4. What are the loads on a gantry girder?

5. Write the classification of steel bridges.

$(5 \times 3 = 15$ marks)

Part B

Answer all questions.

Each question carries 5 marks.

6. Write a short note on IRC class A loading.

7. What is membrane theory of shells?

8. Write briefly about the loads on roof truss.

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

10. What you mean by a plate girder bridge? Write the advantage of providing bracing in plate Girder Bridge.

$(5 \times 5 = 25$ marks)

Part C

Answer all questions.

Each question carries 12 marks.

11. Design a box culvert using the following data. Width of carriage way = 7.5 m, foot path on either side is 0.6 m width, span = 3 m, height of the vent = 3 m. Use M-25 concrete and Fe-415 steel.

Or

Turn over

12. Design the interior slab panel of a T-beam slab bridge, 2.5 m wide between the two main T-beams and 3 m long between the cross girders. Carriage way width is 7 m and kerbs of 500 mm wide are provided. Use IRC Class A loading. Adopt M25 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 8 m and span is 20 m and the thickness of the shell is 80 mm. Take live load of 2 KN/m². Use M-25 concrete and Fe-415 steel. Sketch the details.

Or

14. Design a reinforced concrete shell with a circular directrix with the following dimensions. Distance between the traverse is 20 m, Radius of shell is 6 m, and thickness of shell is 60 mm and semi central angle is 60°. L.L is 100 N/mm² .Use M-20 concrete and Fe-415 steel

15. Design a fink type roof truss for an industrial building given the following data. Overall length is 48 m, overall width is 16.5 m, width of c/c of roof columns is 16 m, height of column is 11 m, and roofing material is asbestos cement sheets.

Or

16. The trusses for a factory building are spaced at 6 m c/c and the purling is spaced at 2 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/m² Design (a) Suitable I-section purlin and (b) Angle section purlin and properly sketch the connections with ACC sheets to purlin.

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

    Crane capacity – 200 kN

    Self weight of the crane girder excluding trolley – 200 kN

    Self weight of the trolley, electric motor, hook, etc. – 40 kN

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

    Wheel base – 3.5 m

    C/C distance between gantry rails – 16 m.

    C/C distance between columns (span of gantry girder) – 8 m.

    Self-weight of rail section – 300 N/m.

    Yield stress of steel – 250 N/mm².

Or

18. Design a plate girder, 20 m span, to be provided in a hall of a restaurant. The superimposed, exclusive self weight is 100 kN/m². Design the web splice at one-third of span and fling angle splice at one-fourth of the span.

19. The effective span of a deck type plate girder high way bridge is 27 m. The width of carriage way is 7.5 m with 1.5 m wide foot paths on either side. The 3 main girders are spaced at 3.5 m c/c. The cross girders are provided at 4 m c/c. The deck slab is 200 mm thick RCC. The bridge has to design for IRS class A Loading.

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 – 20 m.

    C/C distance between plate girders – 2 m.

    Dead load on each girder – 800 N/m.

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

    Lateral load – 9000 N/m.

    Design the super structure of the bridge.

    ($5 \times 12 = 60$ marks)