Total No. of Questions : 10] [Total No. of Printed Pages : 4

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CE–803

B. E. (Eighth Semester) EXAMINATION, June, 2012

(Civil Engg. Branch)

ADVANCED STRUCTURAL DESIGN – II

(Steel)

(CE – 803)

Time : Three Hours

Maximum Marks : 100

Minimum Pass Marks : 35

Note : Answer *one* question from each Unit. Use of relevant IS codes, IRC publications, Bridge rules and Tables is permitted. Missing data, if any, may be suitably assumed. All questions carry equal marks.

Unit – I

1. A deck type plate girder bridge for BG single track main line loading consists of the following details : 20

   Effective span = 16 m

   Spacing of plate girder = 2·0 m c/c

   Weight of rails, fastenings, sleepers etc. = 2000 N/m

   (a) Compute the maximum bending moment and shear force.

   (b) Design the central section of the plate girder.

P. T. O.

Unit – V

9. A steel bunker 10 m length and 5 m width is supported on eight columns (four along each long side) to store coal of bulk density 8 kN/m^3. The angle of internal friction is 35°. Heights of vertical portion and hopper are 4 m each. Determine bursting forces at salient levels. Design the plate and stiffeners in trough portion. 20

Or

10. A circular steel silo of 10 m height and 4 m internal diameter stores cement of bulk density 15500 N/m^3. The angle of internal friction is 25°. The mean size of the particles be assumed to be less than or equal to 60 micron. Determine the horizontal and vertical pressures at 6 m and 10 m depth from top. Also design the wall plates. 20

Or

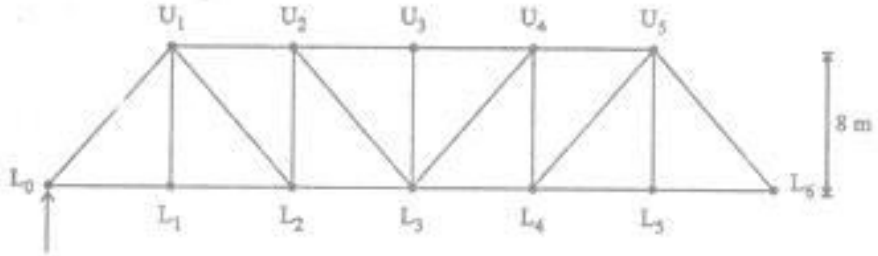
2. Design the section of plate girder to carry a superimposed load of 100 kN/m on an effective span of 24 metres. Take impact factor = 0·4. Also design the end bearing stiffener. 20

Unit–II

3. The Pratt truss shown in Fig. is to be used as one of the two main girders of a single track bridge carrying rolling loads on stringers which in turn are carried by cross girders connected to nodes of the truss. The truss centre lines are 6 m apart while a pair of stringers divide this distance into three equal parts of 2 m each. Dead load on each truss is 25 kN/m, equivalent uniformly distributed live load on each truss is 75 kN/m and impact factor is 20% : 20

   (a) Draw influence lines for the forces in the members L_1, L_2 and $U_2 U_3$.

   (b) Design the sections for the members $L_1 L_2$ and $U_2 U_3$.



Or

4. Following particulars are provided for a FOB (Foot Over Bridge) : 20

   Type of girder : N type truss

   Span of girders : 20 m c/c

Clear walking width between main girders = 3 m

Live load = 4 kN/m^2

Flooring : Timber planks on cross girders.

Design the central top chord and bottom chord members.

Unit–III

5. An elevated cylindrical tank is to be designed for 250 kL capacity. The tank has conical roof and suspended hemispherical bottom. Design the tank for thickness of plates of cylindrical and hemispherical portions. Also design the connections. 20

Or

6. Write detailed notes on the following : 20

   (a) Design of pressed steel tanks.

   (b) Design of stand pipe.

Unit–IV

7. A self-supporting steel chimney is of height 50 m above the foundation and its diameter at top is 4·0 m. Thickness of fire brick lining is 115 mm and this is supported by the climney shell throughout the height. Chimney has two breech openings. The chimney is situated in Indore. The topography of the site is flat and the location is of terrain category 2. Compute wind loads on different zones of chimney and design plates of the lowest zone. 20

Or

8. (a) Discuss the design of chimney base. 10

   (b) Explain the design of Guyed steel stacks. 10