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Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2014

Eighth Semester

Branch : Civil Engineering

ADVANCED STRUCTURAL DESIGN (C)

(Old Scheme—Supplementary/Mercy Chance)

[Prior to 2010 admissions]

Time : Four Hours

Maximum : 100 Marks

Answer **all** *questions.*
Relevant IS *codes may be permitted.*
Any missing data may suitably be assumed.

1. A reinforced concrete simply supported slab is required for the deck of a road bridge the following details :

   1 Clear span = 6.0 m

   2 Width of carriage way = 7.5 m

   3 Foot path on either side = 600 mm wide

   4 Asphaltec concrete weaving cost 75 mm thick

   5 Width of bearing 500 mm

   6 Loading - IRC class A train of vehicle

   7 Use M 25 grade concrete and Fe 415 steel.

   Design the slab and show the details of reinforcement.

(20 marks)

Or

2. A box culvert having the following data :

   1 Inside dimension = 3 m × 3 m

   2 Wall thickness = 250 mm

   3 Dead load = 12 kN/m^2

   4 Live load = 50 kN/m^2

Turn over

5 Angle of repose of soil = 30^o

6 Unit weight of soil = 18 kN/m^3

7 Loading - IRC class AA tracked vehicle

Determine the design Bending moment and direct force.

3. (a) Design a simply supported cylindrical shell with radius = 5 m, span = 18 m, thickness of shell = 60 mm central rise = 1.4 m super imposed load = 1.0 kN/m^2. Use M20 concrete and Fe 415 steel. (20 marks)

(b) Explain the different types of folded plate with neat figure. (13 marks)

Or

4. (a) Explain the principles for membrane theory for symmetrical with UDL. (7 marks)

(b) Explain the structural behaviour of folded plates.

5. (a) Explain common types of trusses used in industrial building along with neat sketches.

(b) A factory building is to be provided with fink truss. Span = 20 m and pitch = 1/5 the height of truss at eves level is 10 m. The spacing of the trusses is 4.5 m the factory building is 36 m long, is situated at Delhi, Design the channel purlins. Take f_y = 250 N/mm^2.

Or

6. Design and detail a simple FAN roof truss with the following data :

Spacing of truss = 4 m

Spam = 10 m

Wind = Consider the place Mumbai

Assume the wind load acts normal to root surface

Pitch of the root 1 m to 5 m

7. Design a gantry girder to carry an electrically operated overhead crane for the following data :

Span = 10 m

Crane capacity = 350 kN

Distance between centres of gantry girder = 18 m

Weight of crab = 80 kN

Min approach distance at crane hook = 1.2 m

Weight of crane girder = 190 kN

Wheel base = 4m

Height of rail = 80 mm

Mass of rail section = 30 kg/m

Use Mg 250

Or

8. A welded plate girder simply supported over a span of 22 m carries a live load of 80 kN/m longer than the span and dead load of 40 kN/m. Design the girder completely.

9. Design a deck type plate girder for mid span section section with the following data :

1 Loading = Single track BG main line

2 Effective span = 24 m

3 Spacing of plane girders = 2 m c/c

4 Weight of stock rails = 440 N/m

5 Weight of guard rails= 260 N/m

6 Weight of fastening = 280 N/m of track

7 Timber sleeper = 250 × 150 × 2800 mm @ 0.4 m c/c

8 Density of timber = 7.5 kN/m^3

Take permissible stresses as per railway steel bridge code.

10. Design a through type place girder bridge for single track BG mainline loading with the following data :

1 Effective span = 24 m

2 Spacing of main girders = 5 m c/c

3 Spacing of cross girders = 3 m c/c

4 Spacing of stringers = 2 m c/c

5 Timber sleepers 250 × 150 × 2800 mm @ 0.4 m c/c

6 Density of timber = 7.5 kN/m^3

7 Weight of stock rail = 440 N/m

8 Weight of guard rail = 260 N/m

9 Weight of fastening = 280 N/m of track.

(5 × 20 = 100 marks)