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**Z 6472**

M.E. DEGREE EXAMINATION, MAY/JUNE 2008.

*Elective*

Structural Engineering

ST 1626 — DESIGN OF STEEL CONCRETE COMPOSITE STRUCTURES

(Regulation 2005)

Time : Three hours

Maximum : 100 marks

IS 1977, IS 2062, IS 8500, IS 961, IS 800 and IRC codes are permitted.

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. List out the advantages of composite beam?
2. What do you mean by Triangular spacing in elastic design.
3. What are the advantages of flexible connectors?
4. Draw the neat sketch of stress distribution of the plastic resistance to compression of an encased 'I' section column.
5. List out the various types of shear connector.
6. Draw the neat cross section of a FINK type prefabricated composite truss.
7. What is the ideal span length of a composite BOX girder bridge?
8. Draw the position of load for getting maximum shear for IRC class 'AA' loading.
9. Draw the neat sketch of 'Fixing of walls to the foundation using Tie - down bolts.
10. How the jointing of staircase raker beam is executed in the field using precast steps?

PART B — (5 × 16 = 80 marks)

11. (a) Explain the behaviour of composite beam under transverse loading for the two extreme cases
- (i) No interaction
  - (ii) 100% (Full interaction)

Or

- (b) What are the advantages of composite construction? Explain briefly.
12. (a) Design a simply supported composite beam with 8 m span. Thickness of the slab is 125 mm. The floor is to carry an imposed load of 3.5 kN/m<sup>2</sup>, including floor finish. The centre to centre distance of the joist is 3 m.

Or

- (b) Find the plastic resistance of a steel column made up of ISHB 200, encased in concrete. The height of the column is 3 m, and is pin-ended.
13. (a) Explain the load bearing mechanism of sheer connectors with neat sketches.

Or

- (b) Design a composite truss of span 8 m with the following data
- Span = 8 m
  - Spacing of Truss = 2.5 m
  - Slab thickness = DS = 150 mm
  - Self weight of deck slab = 2.5 kN/m<sup>2</sup>
  - Maximum laterally un - restrained length in top chord is = 1.2 m
  - Grade of concrete = M 20.
14. (a) Explain briefly the construction procedure of a pre fabricated box girder units with neat sketches.

Or

- (b) Explain the step by step procedure of the design principle of a composite box girder bridge?

15. (a) What do you mean by base Isolation? Draw neat sketch of a five storey 3 bay buildings of conventional structure and seismically isolated structure, with the advantages of DIS seismic isolators.

Or

- (b) Write short notes on :
- (i) Ribbed floor with removable steel pan
  - (ii) Slip forming
  - (iii) Bending resistance of composite slab
  - (iv) Steps in the design of profiled decking.
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