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Question Paper Code: 22062

M.E. DEGREE EXAMINATION, MAY 2014.

Second Semester

Structural Engineering

01PSE202 - DESIGN OF STEEL CONCRETE COMPOSITE STRUCTURES

(Regulation 2013)

Duration: Three hours

Maximum: 100 Marks

(Use of IS 11384 - 1985, IS 800 – 2007, Steel Tables are permitted.)

Answer ALL Questions.

PART A - (10 x 2 = 20 Marks)

1. Name the loads to be considered in the design of buildings.
2. Write the difference between elastic theory and plastic theory for composite structures.
3. Draw a neat sketch of composite truss.
4. What is the purpose of providing transverse reinforcement in slab?
5. Define shear connection.
6. What are the different types of connections in composite structures?
7. Mention any two advantages of using box girder bridge.
8. Sketch the section of a composite box girder bridge.
9. What are the additional requirements of composite column to withstand under seismic forces?

10. How can you calculate the seismic design force for columns?

PART - B (5 x 14 = 70 Marks)

11. (a) Explain in detail the theory and design principles of composite constructions. (14)

Or

(b) Discuss the important properties of materials used in steel – concrete composite construction. (14)

12. (a) Design a composite truss of span 10 m with following data:

Truss spacing = 10 m

Slab thickness = 150 mm

Profile depth = 75 mm

Self weight of deck slab = 2.8 kN/m^2

Maximum laterally unrestrained length on top chord = 1.5 m

Adopt M 30 grade concrete. (14)

Or

(b) Obtain the plastic resistance of steel section of ISMB 250 encased in concrete. The height of column is 3 m and is pin ended. Size of column is 350x350 mm. Steel reinforcement is 4 nos-16 mm diameter and Fe 415. Use M 30 concrete. (14)

13. (a) Explain beam and column connections in composite structures. (14)

Or

(b) (i) What are shear connectors? Mention different types of shear connections. (7)

(ii) Write the advantages of steel concrete composite connection. (7)

14. (a) Explain the behavior of box girder bridge under bending, torsion, torsional warping and distortion. (14)

Or

(b) Explain the step by step procedure for design of box girder bridge. (14)

15. (a) Write short note on seismic behavior of :

(i) Composite columns. (7)

(ii) Composite connections. (7)

Or

(b) Explain about any two case studies on steel concrete composite construction in buildings. (14)

PART - C (1 x 10 = 10 Marks)

16. (a) Explain the characteristic strength of shear connectors. (10)

Or

(b) Explain the factors to be considered while designing the composite structure under seismic loads. (10)
