Reg. No. :

Question Paper Code: 42961

M.E.DEGREE EXAMINATION, NOV 2017

Elective

Structural Engineering

14PSE512 - DESIGN OF STEEL CONCRETE COMPOSITE STRUCTURES

(Regulation 2014)

Duration: Threehours   Maximum: 100 Marks

Answer ALL Questions

(Use of relevant IS codes and Deign aids are permitted)

PART A - (5 x 1 = 5 Marks)

1. Composite materials are

   (a) isotropic but not homogeneous   (b) homogeneous but not isotropic
   (c) both homogeneous and isotropic   (d) neither homogeneous or isotropic

2. The partial safety factor for dead load as per Eurocode is
   (a) 1   (b) 1.15   (c) 1.2   (d) 1.35

3. The reduction factor due to column buckling is a function of
   (a) nondimensional slenderness   (b) axial load
   (c) moment   (d) shear force

4. If d the distance between the flange angles, the vertical stiffeners in plate girders without horizontal stiffeners, are spaced at a distance not less than

   (a) 0.15 d (b) 0.22 d (c) 0.33 d (d) 0.44 d

5. In factory buildings, the horizontal beams spanning between the wall columns supporting a wall covering, are called

    (a) stringers   (b) trimmers   (c) girts   (d) lintels

PART - B (5 x 3 = 15 Marks)

6. List the various factors considered in IS : 11384 code of practice for composite construction.

7. What do you mean by second order effects?

8. Write the failure modes of composite beams.

9. Sketch typical section of box girders used for composite bridges.

10. What is the response of composite structures to seismic effects?

PART - C (5 x 16 = 80 Marks)

11. (a) Discuss about the determination of ultimate moment capacity of a composite section with profile sheeting.   (16)

Or

  (b) Explain the behavior of a composite deck slab and beam construction with neat sketches.   (16)

12. (a) Explain the behavior of steel and concrete under uniaxial stress and and also explain the behavior of composite materials.   (16)

Or

  (b) A square composite column of size 400mm consists of a steel section ISHB 250 and steel reinforcement in terms of 4 nos. 16mm diameter bars of Fe415 grade. The column carries a design load of 1600 kN. The height of the column is 3m. Check the adequacy of the section. Assume suitable data if necessary.   (16)

13. (a) Explain the tests performed to determine the load slip characteristics of shear connectors with neat sketches as per IS and Eurocode recommendations.   (16)

Or

  (b) Define shear connections and explain its types with neat sketches and explain the characteristic strength of shear connectors.   (16)

14. (a) Discuss in detail the local buckling and section classification and explain the design concepts for the checking the adequacy of concrete encased composite section for biaxial bending.. (16)

Or

(b) State and explain the general design principles of composite box girder bridges. (16)

15. (a) Discuss a cost effective study of steel concrete composite construction over conventional construction in building sector. (16)

Or

(b) Explain the factors to be considered while the designing the composite structure under seismic loads. Also explain the seismic behaviour of composite beams and columns.

(16)

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