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**Question Paper Code: 55P64**

M.E. DEGREE EXAMINATION, NOV 2017

Elective

Structural Engineering

15PSE512 – DESIGN OF STEEL CONCRETE COMPOSITE STRUCTURES

(Regulation 2015)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (5 x 1 = 5 Marks)

- Ties are generally \_\_\_\_\_ shaped.
  - V shaped
  - U shaped
  - open ended
  - both (a) and (c)
- The redistribution reduces the support moments, increasing the deflection are known as
  - pattern loading effect
  - shake down effect
  - both (a) and (b)
  - none of these
- As per IS 11384-1985, the spacing between connectors should not be greater than \_\_\_\_\_ times slab thickness.
  - 4
  - 6
  - 3
  - 5
- The depth of the box girder can be assumed to
  - 1/20 and 1/25
  - 1/15 and 1/20
  - 1/25 and 1/30
  - 1/10 and 1/15
- Mechanical interlocks are used to prevent
  - shear bond failure
  - flexure failure
  - both (a) and (b)
  - none of these

PART B - (5 x 3 = 15 Marks)

- What is the Section classification?
- Define shear connectors with diagram.

8. Sketch any two types of Shear Connector.
9. Name any four components of a composite truss bridge.
10. What is push out tests?

PART C - (5 x 16 = 80 Marks)

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

Or

- (b) Explain with neat sketches the various types of steel – concrete composite members. (16)

12. (a) A steel tubular composite column section 400 mm diameter external and 360 mm diameter Internal filled with M30 grade concrete. The height of the column is 3.5m and is pin ended. Determine the plastic resistance of the composite section. (16)

Or

- (b) Design a composite column for an axial load of 350 kN and a bending moment of 35 kNm. Use M25 concrete and the grade of steel whose  $f_y = 355\text{N/mm}^2$ . (16)

13. (a) Explain the functions of shear connector in composite construction. (16)

Or

- (b) Derive necessary expressions for the ultimate moment of resistance for a composite beam with full shear connection. (16)

14. (a) Explain the behavior of box girder bridges under bending torsion, distortion and torsional Warping. (16)

Or

- (b) Explain the various components of composite truss bridges with neat sketches. (16)

15. (a) Explain the seismic behavior of composite beams and column with an example. (16)

Or

- (b) Discuss the recent advance in the steel concrete composite structures. (16)