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Question Paper Code: 55U12

M.E. DEGREE EXAMINATION, APRIL 2019

Elective

Structural Engineering

15PSE512–DESIGN OF STEEL CONCRETE COMPOSITE STRUCTURES

(Regulation 2015)

((Use of IS11384, IS 800 and Steel Tables is permitted))

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART - A (5 x 1= 5 Marks)

1. The tendency of the concrete slab to separate from the steel section is called CO1- R
(a) Shear (b) Uplift (c) Slip (d) Torsion
2. The partial safety factor for steel section is CO2 -R
(a) 1.15 (b) 1.5 (c) 1.2 (d) 1
3. Angles are examples of CO3- R
(a) Flexible connector (b) Rigid connector (c) Bond connector (d) All the above
4. Web stiffeners are used to provide CO4 -R
(a) Flexural rigidity (b) Shear resistance (c) Stiffness (d) None of the above
5. The concrete encased columns in buildings has better resistance to CO5- R
(a) Shear (b) Fire (c) Bending (d) Torsion

PART – B (5 x 3= 15Marks)

6. What is modular ratio? CO1-U
7. What is effective elastic flexural stiffness? CO2-U
8. Define Strength of Connector. CO3-R
9. Sketch any 3 cross sections of box girders. CO4-R
10. Explain Capacity Design. CO5-U

PART – C (5 x 16= 80Marks)

11. (a) Explain the different stages of construction in composite deck slab and beam construction. CO1- U (16)
- Or
- (b) Discuss the types and functions of shear connectors with neat sketches. CO1- U (16)
12. (a) Design a mid span section of a simply supported composite beam with 10m span. The beams are spaced 3m c/c to over 18m length of hall. Thickness of slab is 120 mm. The floor is to carry an imposed load of 2.5 kN / sq.m and partition load of 1.5 kN /sq.m. Assume floor finish load of 0.4 kN / sq.m. Assume suitable data if necessary. CO2- App (16)
- Or
- (b) 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. CO2- App (16)
13. (a) Explain the functions of shear connectors. Also discuss the load bearing mechanism of the shear connectors. CO3-U (16)
- Or
- (b) Explain full shear interaction and partial shear interaction cases with necessary diagrams. CO3-U (16)
14. (a) List out the components of a typical box girder. Explain in detail the functions of each component. CO4 -U (16)
- Or
- (b) Discuss the structural behavior of box girders with neat sketches. CO4 -U (16)
15. (a) Compare the performance of a R.C.C building and a steel concrete composite building through a case study which you have reviewed during the course. CO5-U (16)
- Or
- (b) Explain the seismic behavior of composite beams and columns. CO5-U (16)