C **Reg. No. :** | | | | | | | | | | |

Question Paper Code: 55U12

M.E. DEGREE EXAMINATION, NOV 2018

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 modular ratio is expressed as_____ CO1- R

   (a) Es/Ec (b) Ec/Es (c) Slip (d) Torsion

2. The partial safety factor for concrete is_____ CO2 -R

   (a) 1 .15 (b) 1.5 (c) 1.2 (d) 1.35

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. Write the advantages of steel concrete composite construction. CO1-U

7. Explain a composite truss with a neat sketch CO2-U

8. Draw the idealized load – slip diagram. CO3-R

9. Name any four components of a composite box girder. CO4-R

10. Define: Hysteretic energy. 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)	Derive the expression for ultimate moment of resistance of composite beams as per IS 11384 provisions.	CO1- U	(16)
12.	(a)	Obtain the plastic moment of resistance of a steel section made of ISHB 250 encased in M25Concrete. The height of column is 3.5m and is pinned at their ends. The column dimension is 350mmx 350mm. The area of steel reinforcement is 0.5% of gross concrete area. The grade of steel is Fe 415 and cover to the flanges will be 50mm.	CO2- App	(16)
		Or		
	(b)	Design a simple supported composite beam with 8m span spaced at 3m c/c. thickness of slab = 100mm. The floor has to carry an imposed load of 2 kN/m^2, a construction load of 0.75 kN/m^2 and a floor finish load of 0.5 kN/m^2 floor will not be propped during construction. Check the adequacy of section at construction stage and composite stage. Calculate deflection and stresses. Use M30 grade concrete.	CO2- App	(16)
13.	(a)	Explain the test performed to determine the load slip characteristics of shear connectors with neat sketches.	CO3-U	(16)
		Or		
	(b)	Discuss in detail about the various types of shear connectors and their behaviour with neat sketches.	CO3-U	(16)
14.	(a)	Explain the process of initial design stage for box girders highlighting the economic and practical considerations.	CO4 -U	(16)
		Or		
	(b)	Explain torsional warping and distortion behaviour in box girders.	CO4 -U	(16)
15.	(a)	Explain with sketches the seismic behaviour of composite slabs and connections.	CO5-U	(16)
		Or		
	(b)	Demonstrate a case study on the steel concrete composite construction in buildings.	CO5-U	(16)