

**APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY**  
**THIRD SEMESTER M. TECH DEGREE EXAMINATION**

**Civil Engineering**

**(Structural Engineering and Construction Management)**

**04 CE 7401— Design of Steel Concrete Composite Structures**

Max. Marks: 60

Duration: 3 Hours

*(Use of Eurocode extract & IS Codes are permitted)*

**PART A**

*Answer All Questions*

*Each question carries 3 marks*

1. Comment on the mechanism of load resistance in composite columns
2. Write any three applications of steel-concrete-steel sandwich construction.
3. Write note on selection of effective breadth of composite beam.
4. Explain the typical cross-sections of composite column with figure.
5. What are the properties of shear connectors?
6. What are the types of composite truss members?
7. Explain the advantages of composite girder bridges?
8. Explain the significance of considering the seismic behavior of composite structures.

**PART B**

*Each question carries 6 marks*

9. Explain the role of steel decking in composite construction, its applications and advantages with suitable sketches.

OR

10. What is the difference between RCC and steel-concrete composite construction? Explain the functions of shear connectors in composite construction.
11. Explain elastic behavior of composite beam with full interaction.

OR

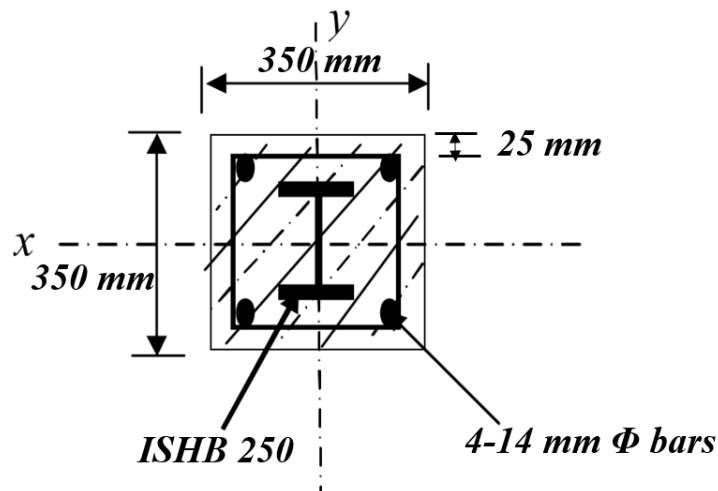
12. Explain the different types of connectors used in steel- concrete- steel sandwich construction and the advantages of steel- concrete- steel sandwich construction.
13. Check the adequacy of the composite beam at composite stage having a span 12 m, spacing of the beams= 4 m, thickness of slab = 150 mm. Floor is carrying an imposed load of  $3.2 \text{ kN/m}^2$ , partition load of  $1.25 \text{ kN/m}^2$  and floor finish of  $0.5 \text{ kN/m}^2$ .

OR

14. Explain composite action in beams, types of composite beams and its advantages.
15. Write detailed design steps for columns with axial load and uniaxial bending.

OR

16. Check the adequacy of the concrete encased composite column of dimensions 350 x 350 x 3000 mm with axial load =1200 kN. Bending Moment about X- axis =160 kN-m, Bending Moment about Y- axis=140 kN-m Use M-30 concrete and Fe-415 steel.



17. Explain the design considerations suggested by Eurocode 4 for the design of composite truss.

OR

18. Design the bottom chord member of a composite truss of span 10 m with the following data, truss spacing= 2.8 m, thickness of slab= 140 mm, profile thickness= 75 mm, self-weight of deck slab=  $2.5 \text{ kN/m}^2$ , top chord restrained at 1.5 m c/c, use M20 concrete and Fe 250 steel.
19. Explain the procedure for the design of composite box girder bridges.

OR

20. Explain the seismic behavior of composite slab and composite connections.