APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
THIRD SEMESTER M. TECH DEGREE EXAMINATION
Civil Engineering
Geomechanics and Structures

04 CE 7301 - 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. Explain different types of shear connectors with example.
2. What is steel concrete steel sandwich construction, list any three applications.
3. Explain different methods of composite construction of beams.
4. Explain the factors to be considered for the design of composite column as per Eurocode.
5. List the advantages of composite truss.
6. Explain the important factors in the design of composite connections.
7. Explain the properties which contribute to good seismic performance of structures.
8. In design of box girder bridge, the choice of box girder is a difficult task-Explain.

PART B
Each question carries 6 marks

9. Explain the different types, orientation and advantages of metal deckings used in composite construction.

OR

10. Compare RCC construction and steel-concrete-steel composite construction.

11. Explain different types of connectors used in steel concrete steel sandwich construction and the advantages of J- hook connectors.

OR

12. Explain elastic behavior of composite beam with no interaction.

13. Check the adequacy of the composite beam at composite stage having a span 12 m, spacing of the beams= 3 m, thickness of slab = 120 mm. Floor is carrying an imposed load of 3.0 kN/m^2, partition load of 1.5 kN/m^2 and floor finish of 0.5 kN/m^2.

OR

14. Write the detailed procedure for the design of composite beams.

15. Write detailed design steps for columns with axial load and biaxial bending

OR

16. Check the adequacy of the concrete encased composite column of dimensions 450 x 450 x 3000 mm with axial load =2100 kN. Bending Moment about X- axis =210 kN-m. Use M-30 concrete and Fe-415 steel.
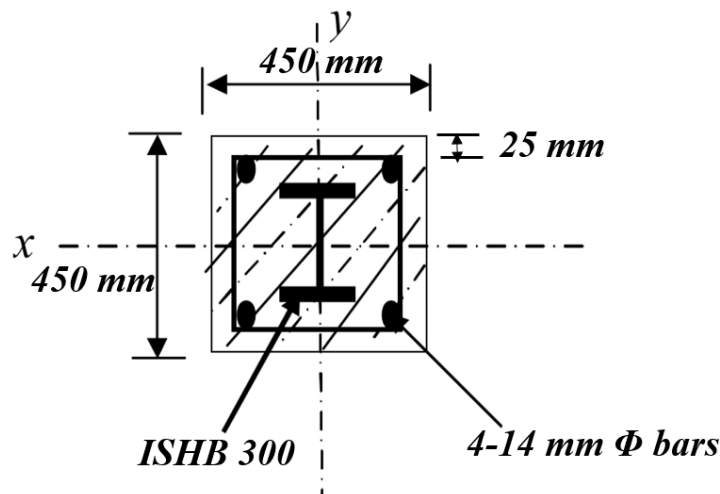
17. Question Design the top chord member of a composite truss of span 11m with the following data, truss spacing= 3.2 m, thickness of slab= 150 mm, profile thickness= 75 mm, self-weight of deck slab= 2.8 kN/m^2, top chord restrained at 1.7 m c/c, use M 20 concrete and Fe 250 steel.

OR

18. Design the bottom chord member of a composite truss of span 10 m with the following data, truss spacing= 3.0 m, thickness of slab= 140 mm, profile thickness= 70 mm, self-weight of deck slab= 2.9 kN/m^2, top chord restrained at 1.5 m c/c, use M 20 concrete and Fe 250 steel.

19. Explain the procedure for the design of composite box girder bridge.

OR

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