Civil Engineering (Structural Analysis)

Part A – Short Answer (2 marks each)

1. Define stress and strain.
2. List the types of beams used in structural design.
3. Explain the concept of shear force in beams.
4. What is the difference between static and dynamic loads?
5. State Hooke's Law.

Part B – Descriptive (5 marks each)

6. Derive the bending equation for a simply supported beam.
7. Explain the working principle of a cantilever beam with a diagram.
8. Calculate the reactions at supports for a beam with given loading.
9. Analyze a truss using the method of joints.
10. Compare the advantages of RCC over steel structures.

Part C – Essay/Design (10 marks each)

11. Design a slab for a residential building using IS code provisions.
12. Propose a structural system for a cyclone-resistant shelter.
13. Critically evaluate the failure of a bridge due to poor load distribution.
14. Develop a maintenance plan for aging concrete structures.
15. Analyze the impact of material selection on structural sustainability.