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M.Tech (STRUCTURAL ENGINEERING)
CIVIL ENGINEERING   FEBRUARY 2019 (Supplem.)
CE 551   THEORY OF PLATES & ELASTIC STABILITY
TIME: 3 Hours   **MM.: 100**

Note: Attempt any FIVE questions. Assume any missing data suitably. Marks allotted to questions are written opposite to them.

1.   Derive the differential equation for the deflection curve in the case of cylindrical bending of rectangular plates. Explain how stresses in such plates are determined.   20

2.   Explain the concept of effective length of columns. Discuss the use of design curves for columns. Supplement your answer with neat sketches.   20

3.   Show that directions of zero slope and maximum slope are perpendicular to each other in pure bending of plates.   20

4(a)   Discuss the differences in the form of deflection patterns in the cases of rectangular plates subjected to uniform loading on the entire area for cylindrical or one way bending. In one case the supports are simple hinged supports and in the other case those are fixed supports. Other parameters remain the same for both the plates.   10

(b)   Explain the stress strain curve of mild steel in detail with a neat sketch.   10

5.   Determine the critical load for a column whose both ends are in a hinged condition. Use standard notations and state the assumptions used.   20

6.   Discuss bending of a circular plate. The plate is subjected to a uniformly distributed load on its entire area and rests freely on its circumference.   20

7.   Write short notes on any two of the following topics.   20
   (a) Determinate structures
   (b) Ductility of steel
   (c) Plates on elastic foundations