

Roll No.

Total No. of Pages : 02

Total No. of Questions : 08

M.Tech.(SE) (Sem.-1)
THEORY AND DESIGN OF PLATES AND GRIDS

Subject Code : CE-503

Paper ID : [E0843]

Time : 3 Hrs.

Max. Marks : 100

INSTRUCTION TO CANDIDATES :

1. Attempt any FIVE questions out of EIGHT questions.
2. Each question carries TWENTY marks.

- Q1. Derive the equations of pure bending of rectangular plates.
- Q2. Determine the deflection and stress in a very long and narrow rectangular plate (i.e., $a \gg b$) if it is simply supported at edges $y = 0$ and $y = b$ (Fig. 1). The plate carries a non-uniform loading expressed by $p(y) = p_0 \sin \frac{\pi y}{b}$ where the constant p_0 represents the load intensity along the line passing through $y = b/2$ parallel to the x axis.

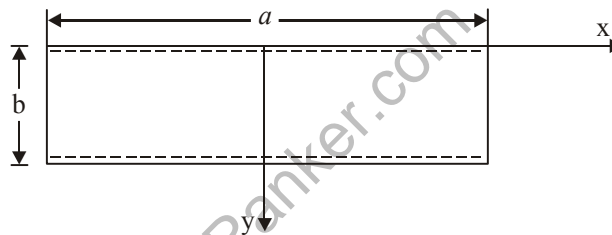


Fig.1

- Q3. Derive the relations between bending moments and curvature in pure bending of plates.
- Q4. A square wall-panel is taken to be simply supported on all edges and subjected to a uniform pressure differential p_0 . Determine the maximum deflection, moment, and stress.
- Q5. Find the expression for the deflection of the clamped solid plate shown in Fig.2 due to line load p distributed along a circle with radius $r = b$.

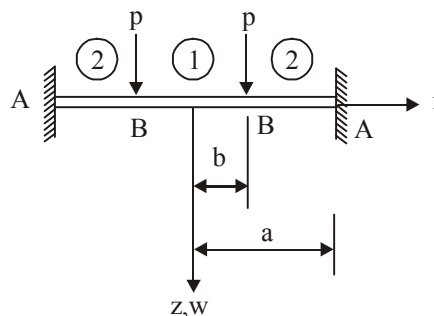
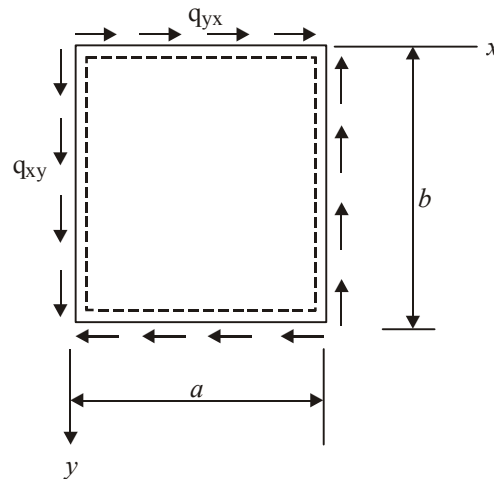


Fig.2

- Q6. Discuss the advantages and disadvantages of Ritz Method.
- Q7. Determine the critical value of uniformly distributed in-plane shear forces q_{xy} for the simply supported rectangular plate shown in Fig.3

**Fig.3**

- Q8. Design a R.C.C Tee beam girder bridge to suit the following data :

Carriage way = 7.5m ; Span (centre to centre of bearings) = 16m ; Loading = I.R.C. Class AA ; Average thickness of wearing coat = 80mm ; M20 grade concrete ; Fe 415 grade tor steel. Design the deck slab.