

Total No. of Questions : 8]

SEAT No. :

P5290

[5562]-142

[Total No. of Pages : 2

M.E. (Civil - Structures)

THEORY OF PLATES AND SHELLS

(2017 Course) (Semester-II) (Credit) (501008)

Time : 3 Hours]

[Max. Marks : 50

Instructions to the candidates:

- 1) *Attempt Q. 1 or Q. 2, Q. 3 or Q. 4, Q. 5 or Q. 6, and Q. 7 or Q. 8.*
- 2) *Neat diagram must be drawn wherever necessary.*
- 3) *Figure to the right indicates full marks.*
- 4) *Assume suitable data, if necessary and clearly state.*
- 5) *Use of cell phone is prohibited in the examination hall.*
- 6) *Use of electronic pocket calculator is allowed.*

Q1) Derive governing differential equation of rectangular plate in Cartesian co-ordinates with usual notation. **[9]**

OR

Q2) A rectangular plate of size $a \times b$ with four edges simply supported carries uniformly distributed load. Derive the expression for the deflection of the plate by Navier method. **[9]**

Q3) A simply supported circular plate of radius a carries uniform loading of intensity q . Find the maximum deflection and expression for radial moment. **[9]**

OR

Q4) Derive stress - displacement relations, compatibility and equilibrium equations for thin shells. **[9]**

P.T.O.

Q5) a) State the application of membrane theory to pipe and hence derive an expression for N_x , N_ϕ and $N_{x\phi}$. [10]

b) State and explain various boundary conditions for circular cylindrical shells. [6]

OR

Q6) a) Derive an equilibrium equation for circular cylindrical shell using membrane theory. [10]

b) Differentiate membrane and bending theory for circular cylindrical shell. [6]

Q7) a) Explain in brief beam method of analysis for cylindrical shells and applications to cylindrical roof shells. [10]

b) Explain in details arch analysis for cylindrical shells. [6]

OR

Q8) a) State and explain Lundgren's beam theory with its application to analysis of shells. [10]

b) Explain in details beam analysis for cylindrical shells. [6]

