Total No. of Questions : 8]

SEAT No. :

P3844

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M.E. (Civil-Structures)

THEORY OF PLATES AND SHELLS

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

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.7or Q.8.***
2) ***Neat diagram must be drawn wherever necessary.***
3) ***Figure to the right indicate 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) a) Derive an expression for flexural rigidity of plate. **[5]**

b) Explain in brief Raleigh-Ritz approach for simple cases in rectangular plates. **[4]**

OR

Q2) a) A square plate of size a x a with all four edges simply supported, carries a uniformly distributed load of intensity q. using Lavy's method determine the maximum deflection in the plate. **[5]**

b) Explain in brief boundary condition for rectangular plates. **[4]**

Q3) a) Derive governing differential equation for circular plate under axi-symmetric loading from first principle. **[6]**

b) State and explain assumption in the theory of thin elastic shells. **[3]**

OR

Q4) a) Obtain an expression of stresses in term of strains due to bending and stretching. **[5]**

b) Obtain moment curvature relations for circular plate. **[4]**

P.T.O.

Q5) a) Derive equilibrium equation for circular cylindrical shell using membrane and bending theory. **[10]**

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

OR

Q6) 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]**

Q7) a) State and explain application of beam theory to cylindrical roof shells. **[10]**

b) Explain in brief application of arch analysis for cylindrical shells. **[6]**

OR

Q8) a) Describe in brief, the Lundgren's beam theory for thin shells with Advantage and limitation. **[10]**

b) Explain in brief application of beam analysis for cylindrical shells. **[6]**