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Question Paper Code: U2604

M.E. DEGREE EXAMINATION, APRIL / MAY 2025

Second Semester

Structural Engineering

21PSE204 - STABILITY OF STRUCTURES

(Regulations 2021)

Duration: Three hours

Maximum: 100 Marks

Answer All Questions

PART – A (5 x 20 = 100 Marks)

1. (a) Derive an expression for critical load of a cantilever column using equilibrium approach. CO2- App (20)
Or
(b) Determine the critical load of a column which is hinged at both ends using equilibrium approach. CO2- App (20)
2. (a) Examine the critical load (using energy method) of a H-H column and F-F having uniform varying moment of inertia. CO3-Ana (20)
Or
(b) Compare Rayleigh reitz method and Galerkins Method of analysis and bring out the salient features. CO3-Ana (20)
3. (a) Illustrate the approximate methods used analysis of beam column in the stability analysis with their merits with real-time examples. CO3-Ana (20)
Or
(b) Derive the differential equation governing the maximum deflection of a beam-column subjected to a central point load. Assume the beam-column has both bending and axial compression effects, and consider the implications of both the axial load and the point load on the overall deflection. CO3-Ana (20)

4. (a) Illustrate the modes of Buckling in frames with real-time examples CO1- App (20)

Or

- (b) Illustrate Matrix approach for buckling of frames with real-time examples. CO1- App (20)

5. (a) Derive and discuss the governing equations for the stability of thin plates subjected to plane (in-plane) loading. How do the boundary conditions, material properties, and plate geometry influence the critical buckling load under plane loading? CO4- Ana (20)

Or

- (b) Calculate the critical buckling load for a thin rectangular plate with simply supported edges under uniform axial compression. Assume linear elasticity and small deflections. CO4- Ana (20)