Q.P. Code: 19CE1010 **R19**

**Reg. No:** | | | | | | | | | | |

**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR**

(AUTONOMOUS)

**M.Tech I Year I Semester Regular Examinations January 2020**

**THEORY OF STRUCTURAL STABILITY**

(Structural Engineering)

Time: 3 hours Max. Marks: 60

(Answer all Five Units **5 x 12 = 60** Marks)

**UNIT-I**

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|---|---|---|---|
| **1** | **a** | Explain the differential equation of slope in case of continuous beams with axial loads. | **6M** |
| | **b** | Explain the critical load conditions for a bar on elastic foundation. | **6M** |
| | | **OR** | |
| **2** | **a** | Derive differential equation for beam column. | **6M** |
| | **b** | What are the approximate methods used in the stability analysis and discuss their merits. | **6M** |
| | | **UNIT-II** | |
| **3** | **a** | With reference to equilibrium conditions explain the concept of stability of a structure. | **6M** |
| | **b** | Explain Euler's theory of columns stability, write assumptions and limitations. | **6M** |
| | | **OR** | |
| **4** | | Derive expression for critical load in case of buckling of bars with intermediate compressive forces. | **12M** |
| | | **UNIT-III** | |
| **5** | **a** | Explain the Tangent Modulus and Reduced Modulus theories | **6M** |
| | **b** | Show that the reduced modulus of rectangular cross section | **6M** |
| | | **OR** | |
| **6** | **a** | Compare the Rayleigh-Ritz and Galerkin's method for obtaining the critical load for columns. | **6M** |
| | **b** | Discuss the effect of shear force on critical load of columns. | **6M** |
| | | **UNIT-IV** | |
| **7** | **a** | Explain torsional buckling. | **6M** |
| | **b** | Explain thin walled bars of open cross section by pure torsion. | **6M** |
| | | **OR** | |
| **8** | | Derive the crippling load for a simply supported beam of narrow rectangular cross section subjected to lateral buckling. | **12M** |
| | | **UNIT-V** | |
| **9** | | Derive the expression for critical moment for a simply supported rectangular beam subjected to pure bending. | **12M** |
| | | **OR** | |
| **10** | | Derive the critical value of the compressive force for buckling of simply supported rectangular plates uniformly compressed using any direction method. | **12M** |

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