**Reg.No. \_\_\_\_\_\_\_\_\_\_\_\_**

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**UNIVERSITY**

(Karunya Institute of Technology & Sciences)

(Declared as Deemed-to-be University under Sec.3 of the UGC Act, 1956)

**End Semester Examination – Nov/Dec – 2017**

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| **Code :** | **14CE3020** | **Duration :** | **3hrs** |
| **Sub. Name :** | **STABILITY OF STRUCTURES** | **Max. marks :** | **100** |

**ANSWER ALL QUESTIONS (5 x 20 = 100 Marks)**

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| **Q. No.** | **Sub Div.** | **Questions** | **Course**  **Outcome** | **Marks** | |
| 1. | a. | Explain Energy approach for buckling of column. | CO1 | 5 | |
| b. | Using higher order differential equation, find the Euler’s critical load for a column with both the ends fixed. | CO1 | 10 | |
| c. | Find the critical load of the column hinged at both the ends using Galerkin’s method of weighted residual. | CO1 | 5 | |
| (OR) | | | | | |
| 2. | a. | Develop an equation for the deflection at mid-height of eccentrically loaded column. | CO1 | | 10 |
| b. | Determine the critical load of a hinged-hinged column shown in Fig. | CO1 | | 10 |
| 3. | a. | An idealized I section of a material having bilinear stress strain characteristics (E up to yield and (5/6) beyond yield) forms the cross section of a pin ended column supporting an axial load at the free end. Determine the critical load based on i. Tangent modulus theory ii. Double modulus theory. | CO1 | | 8 |
|  | b | Develop an expression for buckling load of a single bay single storey symmetric portal frame with span equal to height of columns with side sway. | CO1 | | 12 |
| (OR) | | | | | |
| 4. | a. | Explain in detail Tangent modulus theory. | CO1 | | 5 |
|  | b. | Obtain the reduced modulus of an equilateral triangular section. | CO1 | | 10 |
|  | c. | Distinguish buckling behavior columns, plates and shells. | CO1 | | 5 |
|  |  |  |  | |  |
| 5. | a. | Determine the lateral buckling capacity of a simply supported I beam subjected to pure bending. | CO1 | | 10 |
|  | b. | Develop the energy expression for buckling of thin walled open section and hence find the buckling load of a channel section used as a column with hinged end. | CO1 | | 10 |
| (OR) | | | | | |
| 6. | a. | Develop the governing differential equations for torsional flexural buckling for thin walled open sections. | CO1 | | 10 |
|  | b. | Explain the concept of pure torsion and warping torsion of thin walled open sections and the relevant torsional formulae. | CO1 | | 10 |
|  |  |  |  | |  |
| 7. | a. | Discuss the post buckling behavior of plate. | CO1 | | 4 |
|  | b. | Develop the energy expressions for buckling of plate. | CO1 | | 6 |
|  | c. | Find the critical load of a square plate with clamped ends subjected to uniaxial compression. | CO1 | | 10 |
| (OR) | | | | | |
| 8. | a. | Develop the expression for critical load of a plate uniformly compressed in one direction. The plate is of sides a and b and loaded with compressive force Nx. The loaded edges are simply supported and the other edges are clamped. | CO1 | | 10 |
|  | b. | Find the critical load of a plate with simply supported ends subjected to equal biaxial compression by Finite difference method. | CO1 | | 10 |
|  | |  |  | |  |
|  | | **Compulsory**: |  | |  |
| 9. | a. | Develop Donnel’s equation for buckling of cylindrical shells. | CO1 | | 10 |
|  | b. | Determine the critical stress for cylindrical shell subjected to axial compression. | CO1 | | 10 |

ALL THE BEST