

8. A column in a multistory R.C. building is subjected to an axial force of 2500 kN and a bending moment of 650 kN-m under gravity and earthquake loads. Design the column section for ductility. Use M 25 concrete and Fe 500 steel. **15**

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M. Tech. EXAMINATION, May 2019

(First Semester)

(C Scheme) (Re-appear)

CE(SE)

CES503C

STRUCTURAL DYNAMICS AND
EARTHQUAKE RESISTANT DESIGN

Time : 3 Hours]

[Maximum Marks : 75

Before answering the question-paper candidates should ensure that they have been supplied to correct and complete question-paper. No complaint, in this regard, will be entertained after the examination.

Note : Attempt any *Five* questions. Assume any data if missing in the question paper.

1. Derive the expression for numerical evaluation of Duhamel's integral-undamped system. **15**

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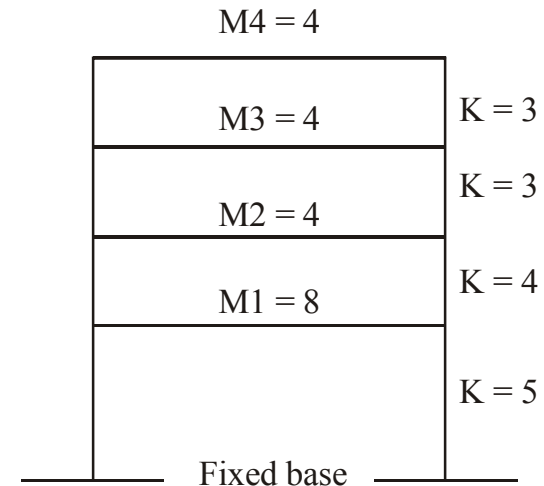
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2. Derive the expression for the damped and undamped single degree of freedom with the help of the free body diagrams. Explain D'Alembert's principle. **15**
3. Explain the response spectrum analysis method in detail with the help of an example. **15**
4. Explain Stodola's method of determining the fundamental frequency with the help of an example. **15**
5. Let us consider a one bay four storey shear building. Taking the masses and column stiffness of each storey as shown in figures. The summed shear stiffness ($2 \times K_i$) of columns. Find out the eigen value and eigen vector of the building as shown below. (m is mass of corresponding floor). **15**



6. Explain the static and dynamic analysis method for calculating the base shear of a building with the help of example. **15**
7. A R.C. frame consists of beam having spans of 5m c/c. A typical floor inner beam carries a negative bending moment of 420 kN-m and shear of 515 kN at the face of beam column joint due to gravity and earthquake loads. Design the beam section for ductility. Use IS 13982:2016. **15**