Fundamentals of Earthquake Engineering for Building Structures
Session 3: Building Dynamics and response – March 1, 2021
Due: March 29, 2021, 8:00 am EDT – Submit through the online form

Pick the best answer.

1) The Complete Quadratic Combination (CQC) is preferred over the Square-root-of-the-sum-of-the-squares (SRSS) for combining modal responses when
   a) Modes are widely spaced
   b) Modes are closely spaced

2) How are modal response spectrum values for displacements combined?
   a) Addition
   b) Subtraction
   c) Square-root-of-the-sum-of-the-squares (SRSS)
   d) Complete Quadratic Combination (CQC)
   e) All of the above
   f) C&D

3) How are modal response spectrum values for drifts obtained?
   a) Combine modal displacements for each story using SRSS or CQC methods, then take the difference between the displacements calculated at adjacent stories
   b) Combine modal displacements for each story using SRSS or CQC methods, then take the sum of the displacements calculated at adjacent stories
   c) Calculate the difference between the displacements determined at adjacent stories mode by mode, then combine the differences using SRSS or CQC methods
   d) None of the above

4) For a three-story building, which is likely to be the dominant mode?
   a) The first mode, because it has the highest modal mass and participation factor
   b) The third mode, because it has the shortest period and will have a higher spectral acceleration
   c) The second mode, but don't ask me why

5) Which mode tends to have the highest overturning?
   a) The first mode
   b) The highest mode

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6) Which is true of a modal response spectrum analysis?
   a) Signs are lost in the process
   b) Results are not statically consistent
   c) All quantities of interest must be tracked mode by mode
   d) All of the above
   e) None of the above

7) Inelasticity
   a) Always affects all modes equally
   b) May affect some modes more than others

8) Vertical response
   a) May always be neglected
   b) Never exceeds 20% of gravity
   c) Is significant for large cantilevered masses

9) A simplified two-dimensional model of a four-story building should have
   a) Four modes
   b) Eight modes
   c) Sixteen modes

10) Very stiff diaphragms may be idealized as rigid such that they have
   a) Six degrees of freedom at every node
   b) Three degrees of freedom at every node
   c) Three degrees of freedom in total