1. What does a Response Spectrum represent in earthquake engineering?

a) Magnitude of an earthquake
b) Ground shaking at a specific location
c) Building’s structural response
d) Seismic waves propagation

Answer: c) Building’s structural response

Explanation: Response Spectrum illustrates a structure’s response to seismic excitation at varying frequencies. It plots the maximum response of a structure against the frequency content of ground motion.

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2. Which term describes the maximum displacement experienced by a structure during an earthquake?

a) Peak Ground Acceleration
b) Peak Ground Velocity
c) Peak Displacement
d) Peak Response

Answer: c) Peak Displacement

Explanation: Peak displacement refers to the maximum movement experienced by a structure during seismic activity, a crucial parameter in assessing structural integrity and

performance.

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3. In elastic response spectra, what remains constant regardless of the earthquake magnitude?

a) Peak ground acceleration
b) Natural frequency of the structure
c) Damping ratio of the structure
d) Spectral acceleration

Answer: b) Natural frequency of the structure

Explanation: In elastic response spectra, the natural frequency of the structure remains constant regardless of the earthquake magnitude, making it a key parameter in analyzing structural response.

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4. Which component of the tripartite (D-V-A) response spectrum represents the duration of ground shaking?

a) D – Duration
b) V – Velocity
c) A – Acceleration

d) None of the above

Answer: a) D – Duration

Explanation: The ‘D’ component in the tripartite (D-V-A) response spectrum represents the duration of ground shaking, indicating how long the structure will experience seismic forces.

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5. What does the ‘A’ in the tripartite response spectrum primarily signify?

a) Amplitude of ground shaking
b) Attenuation of seismic waves
c) Acceleration of the structure
d) Area under the spectrum curve

Answer: c) Acceleration of the structure

Explanation: The ‘A’ component in the tripartite response spectrum primarily represents the acceleration experienced by the structure due to seismic forces.

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6. In earthquake-resistant design, what role does the response spectrum play?

a) Determining the earthquake magnitude

b) Estimating building material costs
c) Evaluating structural performance
d) Analyzing soil composition

Answer: c) Evaluating structural performance

Explanation: Response spectra aid in assessing how structures respond to seismic forces, facilitating the design of earthquake-resistant buildings by evaluating structural performance under varying earthquake conditions.

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7. Which procedure is commonly used to compute seismic forces in multi-storeyed buildings as per codal provisions?

a) Finite Element Analysis
b) Response Spectrum Analysis
c) Time History Analysis
d) Static Analysis

Answer: b) Response Spectrum Analysis

Explanation: Response Spectrum Analysis is commonly employed in earthquake engineering to compute seismic forces in multi-storeyed buildings in accordance with codal provisions, providing efficient and reliable results for structural design.

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8. What parameter does the area under the response spectrum curve represent?

a) Seismic intensity
b) Structural stiffness
c) Energy dissipation
d) Ground motion frequency

Answer: c) Energy dissipation

Explanation: The area under the response spectrum curve represents the energy dissipated by the structure during seismic events, reflecting its capacity to absorb and mitigate seismic forces.

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9. Which type of response spectrum considers the effects of structural yielding and plastic deformation?

a) Elastic response spectrum
b) Inelastic response spectrum
c) Damped response spectrum
d) Acceleration response spectrum

Answer: b) Inelastic response spectrum

Explanation: Inelastic response spectrum accounts for the effects of structural yielding and plastic deformation, providing a more accurate representation of a structure’s behavior under severe seismic loading conditions.

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10. How do seismic forces computed using response spectrum analysis differ from those computed using static analysis?

a) They are always higher
b) They are always lower
c) They may be higher or lower depending on the structure
d) They are independent of the structural properties

Answer: c) They may be higher or lower depending on the structure

Explanation: Seismic forces computed using response spectrum analysis may differ from those computed using static analysis, as they account for dynamic effects and frequency-dependent characteristics of the structure, leading to variations in the results based on structural properties.