

## **Seismic Academy MCQs**

1. According to IS 1893, what does Zone Factor (Z) represent?
  - A. Soil strength at the site
  - B. Maximum considered earthquake intensity for a region**
  - C. Building importance factor
  - D. Structural damping value

Correct Answer: B

2. According to IS 1893, the fundamental natural period of a moment-resisting RC frame building depends primarily on:
  - A. Width of the building
  - B. Height of the building**
  - C. Soil bearing capacity
  - D. Column reinforcement

Correct Answer: B

3. According to IS 1893, which soil type generally produces the highest seismic amplification?
  - A. Hard rock
  - B. Medium soil
  - C. Soft soil**
  - D. Gravel

Correct Answer: C

4. What does Response Reduction Factor (R) represent in IS 1893?
  - A. Reduction due to soil settlement
  - B. Reduction in seismic force due to ductile behaviour**
  - C. Reduction due to wind loads
  - D. Reduction in gravity loads

Correct Answer: B

5. According to IS 4326, which structural element improves the seismic resistance of masonry buildings?
  - A. Lintel band
  - B. Roof band
  - C. Plinth band
  - D. All of the above**

Correct Answer: D

6. According to IS 4326, the main purpose of horizontal seismic bands is to:
- A. Improve aesthetics
  - B. Increase vertical load capacity
  - C. **Improve overall structural integrity during earthquakes**
  - D. Reduce foundation settlement

Correct Answer: C

7. According to IS 13920, lap splices in beams should preferably be located:
- A. At beam-column joints
  - B. At beam supports
  - C. **At midspan of the beam**
  - D. Near shear walls

Correct Answer: C

8. Torsional response in buildings mainly occurs due to:
- A. Uniform stiffness distribution
  - B. Symmetrical building layout
  - C. **Eccentricity between mass and stiffness**
  - D. Uniform mass distribution

Correct Answer: C

9. According to IS 13920, lap splices in beams should preferably be located:
- A. At beam-column joints
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  - B. Symmetrical building layout
  - C. **Eccentricity between mass and stiffness**
  - D. Uniform mass distribution

Correct Answer: C

## **Scenario-Based Seismic MCQs**

### **1. Critical Facility Design**

An engineer is designing a hospital building in a high seismic zone. The building must remain operational after an earthquake. Which parameter should be increased in seismic design calculations?

- A. Response reduction factor
- B. Importance factor**
- C. Soil factor
- D. Damping ratio

Correct Answer: B

### **2. Torsional Irregularity in Buildings**

A building located in Seismic Zone IV shows significant torsional rotation during analysis. What is the most likely cause?

- A. Heavy slab reinforcement
- B. Eccentricity between center of mass and center of stiffness**
- C. Increased column size
- D. Excessive beam depth

Correct Answer: B

### **3. Strong Column–Weak Beam Principle**

During design review, an engineer notices that beam strength is higher than column strength at several joints. According to ductile design principles, what modification is required?

- A. Increase beam reinforcement
- B. Reduce column stiffness
- C. Increase column strength**
- D. Reduce beam span

Correct Answer: C

### **4. Soft Storey Identification**

A ground floor of a commercial building has large open spaces for parking and significantly fewer walls than upper floors. What seismic irregularity does this create?

- A. Vertical mass irregularity
- B. Soft storey**

- C. Plan irregularity
- D. Torsional stiffness

Correct Answer: B

### 5. Resonance in Structures

An engineer observes that a building's natural period matches the dominant period of ground motion during an earthquake. What phenomenon may occur?

- A. Soil liquefaction
- B. Resonance**
- C. Structural damping
- D. Load redistribution

Correct Answer: B

6. An existing RC column shows insufficient load capacity and poor ductility during seismic assessment. The engineer decides to increase both strength and confinement. Which retrofitting method is most suitable?

- A. RC jacketing**
- B. FRP wrapping
- C. Steel bracing
- D. Surface plastering

Correct Answer: A

7. A structure requires rapid strengthening with minimal downtime, and increasing member size is acceptable. Which retrofitting technique is preferred?

- A. RC jacketing
- B. FRP wrapping
- C. Steel plate jacketing**
- D. Masonry infill

Correct Answer: C

**8. A column retrofit design includes closely spaced transverse reinforcement. What is the primary purpose of this provision?**

- A. Increase column height**
- B. Reduce axial load**
- C. Improve aesthetics**
- D. Improve confinement and prevent buckling**

**Correct Answer: D**

**9. During retrofitting, engineers notice poor bonding between old concrete and new jacket. What is the main risk if this issue is not addressed?**

- A. Increase in stiffness**
- B. Reduction in building height**
- C. Loss of composite action**
- D. Increase in damping**

**Correct Answer: C**

**10. A RCC simply supported beam is deficient in shear by 60%. There is space constraint and debonding issue needs to be avoided. What is the suitable retrofit solution for this?**

- A. RC Jacketing**
- B. Steel plate jacketing**
- C. Strengthening with HIT shear**
- D. FRP wrapping**

**Correct Answer: C**