

22232

3 Hours / 70 Marks

Seat No.

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- Instructions :**
- (1) All Questions are *compulsory*.
  - (2) Illustrate your answers with neat sketches wherever necessary.
  - (3) Figures to the right indicate full marks.
  - (4) Assume suitable data, if necessary.
  - (5) Preferably, write the answers in sequential order.

**Marks****1. Attempt any FIVE :****10**

- (a) Define focal depth and epicentre.
- (b) State two characteristics of body waves.
- (c) State any two causes of occurrence of earthquake.
- (d) Define centre of mass and centre of stiffness.
- (e) State any two causes of damages of RCC building due to earthquake.
- (f) State any functions of bands provided in masonry construction.
- (g) State two lessons learned from Bhuj earthquake 2001.

**2. Attempt any THREE :****12**

- (a) Define shocks and state its classification.
- (b) Identify any four safety measures required to minimize the damage due to earthquake in the given zone.
- (c) Explain any four direct effects of an earthquake.
- (d) Explain with sketch "Elastic rebound theory".



- 3. Attempt any THREE :** **12**
- (a) Explain the concept of enclosed area and separate building for different functions along its importance.
  - (b) Explain four typical damages and failures takes place in masonry construction during earthquake.
  - (c) State any four recommended provisions of IS:4326 to improve seismic resistance of masonry buildings.
  - (d) Explain Killari (Latur) earthquake with respect to the following points :
    - (i) Magnitude
    - (ii) Human loss
    - (iii) Lifelines
    - (iv) Intensity
- 4. Attempt any THREE :** **12**
- (a) Explain the step-by-step procedure for calculating the design seismic base shear for the given building frames as per relevant IS provision.
  - (b) State any four assumptions in design of earthquake resistant structures.
  - (c) Draw typical sketch of steel reinforcement arrangement in seismic RC beams provided with ductile detailing as per IS:13920.
  - (d) Draw a neat sketch of cross-ties used in ductile detailing showing standard values.
  - (e) Differentiate between soft storey and weak storey. State any two safety measures taken to avoid their adverse effect.
- 5. Attempt any TWO :** **12**
- (a) Draw sketches of any three types of movement of tectonic plates.
  - (b) Identify any three probable characteristics of ground shaking and ground failures when earthquake magnitude is 7 on Richter's scale.
  - (c) Suggest any three geometric shapes of a building to improve its resistance against earthquake with justification.
- 6. Attempt any TWO :** **12**
- (a) Suggest action plan required to improve the structural stability of the RCC structure against earthquake in Nasik region.
  - (b) Draw sketches of any three damages in brick masonry structures due to earthquake.
  - (c) Draw typical sketches to represent the methods to strengthen steel structure with roof truss against earthquake damages in Pune region.
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