Roll No. ☐☐☐☐☐☐☐☐☐☐☐   Total No. of Pages : 02

Total No. of Questions : 18

B.Tech. (CE)   (Sem.–5)

ELEMENTS OF EARTHQUAKE ENGINEERING

Subject Code : BTCE-502-18

M.Code : 78461

Time : 3 Hrs.   Max. Marks : 60

INSTRUCTION TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**

SECTION-A

Answer briefly :

1) Define Lateral Design Force.

2) Differentiate between Rayleigh waves and Love waves.

3) List any two typical damages observed in Masonry arches due to earthquakes.

4) What is Response Reduction Factor?

5) Define iso-seismals.

6) Give the criteria for minimum diameter of steel in case of longitudinal and Transverse reinforcement in Beams as per IS 13920.

7) What is over damped system?

8) List various seismic zones in India.

9) Write general equation of motion of S.D.O.F. systems subjected to transient forces.

10) Explain briefly the concept of soft storey.

SECTION-B

11) Discuss the role of confinement reinforcements in RC buildings. Explain briefly where it is provided and what provisions of IS13920 are to be followed.

12) Differentiate between Magnitude and Intensity of Earthquake.

13) a) Discuss various lessons learnt, in case of traditional rural buildings, from past Earthquake studies.

   b) Design special slender shear wall for the hospital building of span length 30m.

14) What is Base shear force? Discuss briefly the various factors on which it depends. Illustrate using proper equations as per IS 1893.

15) Special care is taken while providing openings in bearing walls. Justify it as per IS 4326.

SECTION-C

16) A block of mass 80 kg is suspended from a spring having stiffness of 820N/mm. An unbalanced disturbing force of 450N is acting on it, with frequency equal to .65 times the natural undamped frequency. Calculate natural frequency of undamped and damped vibrations. Also determine the amplitude of motion due to unbalance and the phase difference with respect to exciting force.

17) Appropriate measures should be considered while providing splices in RC components. What are those provisions in case of Beams and columns as per Indian Standard Code of Practice for Ductile Design and detailing of Reinforced Concrete Structures, subjected to Seismic Forces?

18) Discuss any two past Earthquake studies in detail. Also enlist various lessons learnt from those Earthquakes.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.