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APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

SECOND SEMESTER M.TECH DEGREE EXAMINATION, MAY 2016

Civil Engineering

(Geomechanics and Structures)

04 CE 6316 Earthquake Analysis & Design of Structures

Max. Marks: 60 Duration: 3 Hours

PART A

Answer **all** *questions*

Each question carries 3 marks

1. Write a brief note on elastic rebound theory.
2. What is damping factor? Derive a relation between damping factor and damped natural frequency.
3. Explain seismic design philosophy.
4. Write down the advantages of shear walls in RC buildings.
5. Differentiate 2D plane frame model and 3D space frame model
6. Explain metallic dampers.
7. Explain the basic concept of base isolation.
8. Differentiate elastomeric bearing system and sliding base isolation system.

PART B

(Answer **all** *questions)*

Each question carries 6 marks

9. Write a brief note on seismotectonics and seismic microzonation.

OR

10. Describe body waves and surface waves with neat sketch.
11. A simply supported girder of 3.5mspan and a mass of 87.5kg was subjected to a concentrated impulsive force at midspan. In the free damped oscillation which followed, the ratio of two successive amplitudes of the girder at the centre was 1.3. Calculate the

time taken for the amplitude of vibration to decay to $1/50^{th}$ of the initial displacement. Given I = 2290cm^4 and E=200kN/mm^2.

OR

12. Explain evaluation of earthquake forces as per codal provisions.
13. Explain the causes of damage of RCC structures due to earthquake.

OR

14. Discuss the guidelines for construction of earthquake resistant earthen buildings.
15. Design a shear wall of length 4.16m and thickness 250mm subject to the following forces. Assume fck=25N/mm^2 and fy =415N/mm^2. (*Design of boundary elements are not required*)

Loading	Axial force (kN)	Moment (kNm)	Shear (kN)
DL + LL	1950	600	20
EL	250	4800	700

OR

16. How do columns in RC buildings resist earthquakes?
17. Explain the step by step procedure for capacity based design.

OR

18. Briefly explain the vibration control in buildings using dampers.
19. Explain sliding base isolation systems.

OR

20. Present case studies of base isolation system for any three important buildings subjected to earthquake.