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APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

SECOND SEMESTER M.TECH DEGREE EXAMINATION APRIL/MAY 2018

Branch: Civil Engineering

Stream: Structural Engineering

01CE6106 Analysis and Design of Earthquake Resistant Structures

Answer *any two full* questions from *each* part

Limit answers to the required points.

Draw neat sketches wherever required

IS 456, Column design charts, IS 1893 and IS 13920 are permitted

Max. Marks: 60 Duration: 3 hours

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PART A

1.	a.	Explain earthquake magnitude	(4.5)
	b.	Explain earthquake intensity	(4.5)
2.	a.	What are the architectural features to be adopted and to be avoided to make buildings resistant against earthquakes?	(9)
3.	a.	Explain the causes of earthquakes?	(4.5)
	b.	What are the modes of failure of a masonry wall without vertical reinforcement under the influence of earthquake?	(4.5)

PART B

4.	Explain the design philosophies and the desirable collapse mechanisms in earthquake resistant design	(9)
5	Determine the lateral forces due to earthquake at all the floor levels of a plane frame of a two bay four storeyed symmetric RC building situated in Delhi with the following data:	(9)

Floor height	3.5m
Bay width	5m
Spacing of frames	5m
Live load	3.5 kN/m2
Concrete	M 20
Steel	Fe 415

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Beams	250 x 400 mm
Columns	250 x 450 mm
Slabs	100 mm thick
Type of soil	Rocky
Building	S M R F

Unit weight of R C C 25 kN/m^3

Unit weight of brick masonry 20 kN/m^3

Infill walls (brick) 250 mm thick longitudinal walls and 150 mm thick transverse walls

6. How is torsion induced in buildings. What are the remedial measures. (9)

PART C

7. Design as per IS 13920 a rectangular column to carry a factored load of 2800 kN and a uniaxial moment of 230 kNm. The column has an unsupported length of 3 m and is braced against side sway. Use M25 concrete and Fe415 steel. Detail the column showing all the reinforcement. (12)

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8. Explain the methods for repair of earthquake damaged buildings. (12)

9. a. What are the uses of shear walls (6)

   b. Explain the different shapes of shear walls and explain how shear walls are to be provided in buildings (6)

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