Code: 13A01708 **R13**

B.Tech IV Year I Semester (R13) Supplementary Examinations June 2017

EARTH QUAKE RESISTANT DESIGN OF STRUCTURES

(Civil Engineering)

(Use of IS: 1893-2002 is allowed in the examination hall)

Time: 3 hours Max. Marks: 70

PART – A

(Compulsory Question)

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1 Answer the following: (10 X 02 = 20 Marks)

(a) Explain about Lumped mass system.
(b) Write about simple harmonic motion.
(c) Differentiate between free vibration and force vibration.
(d) Explain about Multi –Degree of freedom systems.
(e) Write about precautions to be considered in earth quake design.
(f) How many zones are in India as per IS: 1893-2002 (part – I)? Name them.
(g) Explain about epicenter.
(h) Write about classification of earth quake.
(i) Explain about mass regularities.
(j) What is a shear wall?

PART – B

(Answer all five units, 5 X 10 = 50 Marks)

UNIT – I

2 Explain with neat figure the elements of a vibratory system? Derive an equation of motion for free vibration of SDOF system for undamped condition.

OR

3 (a) Name the various modeling techniques of the structures. Briefly explain lumped mass approach with a neat sketch.
(b) Explain under damped, over damped and critically damped cases for SDOF system.

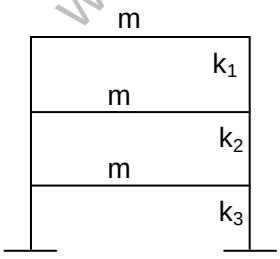
UNIT – II

4 (a) What is a mode shape? How it is computed? Explain.
(b) Derive an undamped free vibration equation of MDOF and explain about Eigen values.

OR

5 Find the fundamental mode and frequency of the given fig by Stodola's method.

M = 3500 kg, $k_1 = k = 1500$ kN/m, $k_2 = 1.5k$, $k_3 = 2.0k$.



UNIT – III

6 What are the assumptions made in the analysis of earthquake resistant design of buildings? And mention and explain briefly the factors taken into account in seismic analysis.

OR

7 (a) Mention the different methods of seismic analysis. Explain equivalent lateral force method of analysis.
(b) How architectural features affect buildings during earthquakes?

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UNIT – IV

8 (a) What are the instruments used for recording the ground shaking during seismic activity? Discuss the working principle of these instruments.

(b) Differentiate between the body waves and surface waves and explain the characteristics of these waves.

OR

9 (a) Explain the concept of plate tectonic theory and write a note on strong ground motions.

(b) What are the differences between magnitude and intensity?

UNIT – V

10 Explain about the following:

(a) Vertical irregularities and plan configuration problems.

(b) Mass Irregularities.

(c) Torsion Irregularities.

OR

11 (a) Explain about shear walls.

(b) How do you design the shear walls as per IS: 13920? Explain in detail.

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