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B.Tech.(CE) (2011 Onwards) (Sem.-6)
ELEMENTS OF EARTHQUAKE ENGINEERING
Subject Code : BTCE-602
M.Code : 71083

Max. Marks : 60

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.**
4. **Assume any missing data.**

Q1 Answer briefly :

- a. Define ISO-Seismals.
- b. Distinguish between compression wave (p) and shear waves (s).
- c. List **any 2** typical features of damages due to earthquake in masonry buildings.
- d. What is transmissibility ratio?
- e. What is the reason for studying the vibration of single degree of freedom system?
- f. Give the expression for computing design base shear along any principal direction.
- g. Write in brief about the response reduction factor.
- h. Is it desirable to have high strength steel in earthquake resistance design of reinforced concrete structure? Justify your answer.
- i. What is dynamic magnification factor? Give expression also.
- j. Give criteria for minimum thickness of shear wall as suggested by the IS 13920:1993.

SECTION-B

- Q2 Describe the theory of plate tectonics and also four major scientific development by the theory.
- Q3 A mass of 100 k.g is supported on springs of total stiffness of 785N/mm. The machine produce an unbalanced disturbing force of 392 N at a speed of 50 c/s. Assuming a damping factor of 0.2, determine :
- The amplitude of motion due to unbalance
 - The transmissibility.
- Q4 How does floor diaphragm action effects structural performance?
- Q5 Describe the various factors that influence the ductility of structures.
- Q6 What are ductility provisions in reinforced concrete construction?

SECTION -C

- Q7 A body of mass 70 k.g is suspended from a spring with stiffness of 35 kn/m. The damping ratio of the spring is 23% of the critical damping. If the body is subjected to a periodic force of 700N and a frequency equal to 0.78 times the natural undamped frequency, calculate the amplitude of forced vibrations and phase difference with respect to the exciting force. Also calculate the natural frequency of undamped and damped vibrations and ratio of successive amplitude for damped vibrations.
- Q8 Explain the seismic behavior of masonry building during past earthquakes several lessons learned.
- Q9
- How shear walls are classified? Derive formula to compute moment of resistance for rectangular shear walls.
 - With the help of an example discuss the seismic design procedure of a shear wall. Show the reinforcement details in reinforced concrete shear wall designed by you.

NOTE : Disclosure of identity by writing mobile number or making passing request on any page of Answer sheet will lead to UMC against the Student.