

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY,
WAKNAGHAT

TEST – 1, FEBRUARY 2020

MTech 2nd Semester Structures & BTech 8th Semester Civil

Course Code: 11M1WCE213

Max. Marks: 15

Course Name: Earthquake Resistant Design of Structures

Max. Time: 1 hr.

Course Credits: 03

Note: All questions are compulsory. Marks are indicated against the questions. Carrying of mobile phone is strictly prohibited and will be treated as case of unfair means.

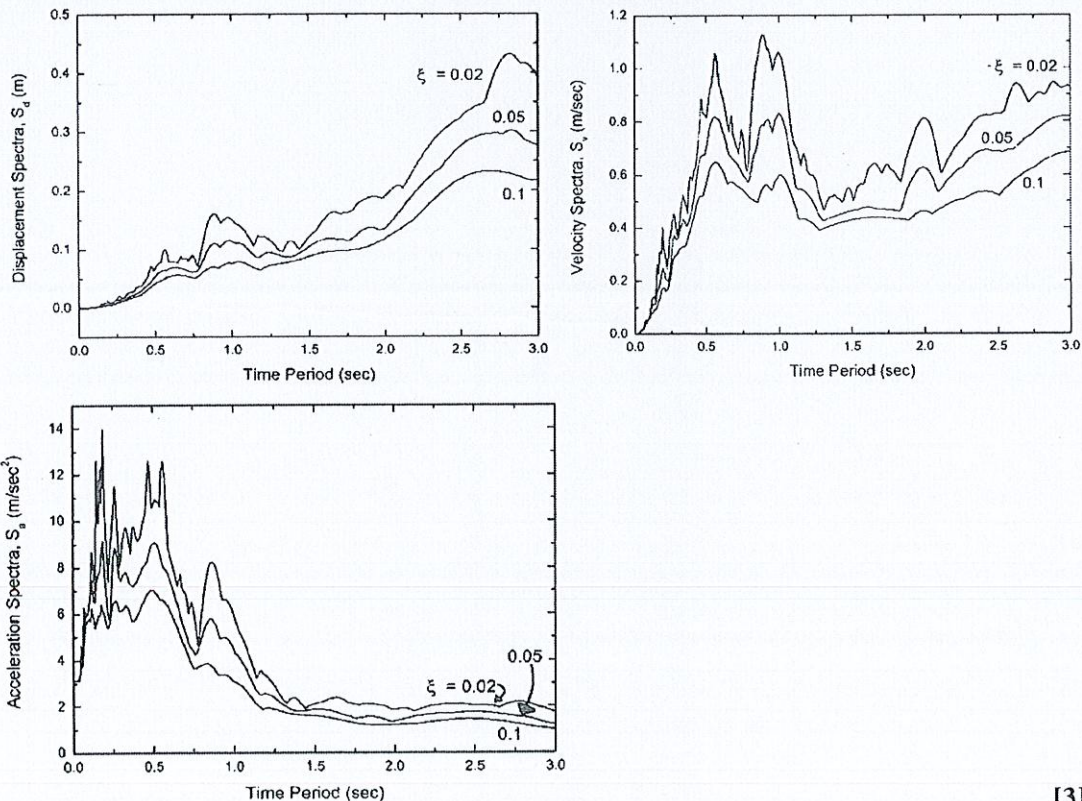
Q.1 Discuss different type of seismic waves with a neat sketch. [2]

Q.2 (i) Explain elastic rebound theory in detail.

(ii) With the help of neat diagram explain different type of faults generated due to earthquake. [2+2]

Q.3 Derive the solution for single degree of freedom undamped structure experiencing a harmonic loading of $P_0 \cos(\lambda t)$ [3]

Q.4 Consider a SDOF system with mass, $m = 2 \times 10^3$ kg, stiffness, $k = 60$ kN/m and damping, $c = 0.44$ kN.sec/m. Using the response spectra of El-Centro, 1940 earthquake, compute (a) Maximum relative displacement, (b) Maximum base shear and (c) Maximum strain energy.



[3]

Q.5 If epicentral intensity of an earthquake is measured as VIII is MMI scale find out its maximum ground velocity and Magnitude of that earthquake. [1]

Q.6 Determine the free vibration response (displacement and velocity) of an SDOF system at time $t=0.20\text{s}$ which has its natural circular frequency $\omega = 12\text{rad/s}$, Damping factor $\xi = 0.15$, initial velocity $\dot{u}(0) = 10\text{ cm/s}$ and initial displacement $u(0) = 5\text{cm}$. [2]