PAPER 1

Q.1 Attempt all

A. Define Epicenter.

B. Define Hypocenter.

C. List various methods of seismic analysis of R.C. building based on IS:1893-2002.

D. Define focus.

E. Define Resonance.

F. Define coefficient of damping.

G. What is Logarithmic decrement?

H. Define Isoseismal lines.

Q.2 Attempt any six

A. List the step by step method for seismic analysis of R.C. building as per IS code 1893 (Part 1): 2002 by Response Spectrum Method.

B. Enumerate the seismic design philosophy in brief.

C. List the step by step method for seismic analysis of R.C. building as per IS code 1893 (Part 1): 2002 by Response Spectrum Method.

D. How will you plot Seismograph? Discuss this with a neat sketch of typical seismograph system.

E. Explain the acceleration response spectrum of IS-1893 giving in detail the factors on which the response acceleration depends.

F. Explain in brief, various modes of failure of masonry buildings with neat sketches. Also write in brief the special measures to make the masonry structure earthquake resistant.

G. What are different lateral load resisting systems in building structure? Explain in detail with the help of their neat sketches.

H. Discuss the 'Liquefaction' phenomenon. What method you will follow for the dynamic analysis of soil-structure system. Also write their relative advantages and disadvantages

Q.3 Attempt any two

A. Deduce the expression for displacement components and two natural frequencies of the two degree of freedom system with an intermediate coupling spring.

B. Explain the step by step procedure to calculate the base shear of building according to IS: 1893-2002.

C. Design an unreinforced 6 m high masonry shear wall, using following data.

Unit weight of wall = 20 kN/m^3.

Prism structure of masonry = 10 Mpa

Seismic force, H =30 kN

Superimpose load is to be neglected and assume wall thickness = 400 mm.

PAPER 2

Q.1 Write short notes on Magnitude and Intensity of Earthquake.

Q.2 An SDOF system consists of a mass with weight of 175 kg and a spring constant, k = 530kN/m. While testing the system a relative velocity of 30 cm/s was observed on application of a force of 450 N. Determine the damping ratio, damped frequency of vibration, logarithmic decrement, and the ratio of two consecutive amplitudes.

Q.3 What do you mean by degree of freedom?

Q.4 Derive expressions for free vibrations of undamped systems having single degree of freedom, with suitable diagram.

Q.5 Write short notes on Seismic Zoning.

Q.6 A vibrating system consisting of a mass of 50kg and a spring of stiffness 4 x 10^4 N/m is viscously damped. The ratio of two consecutive amplitude is 20:18. Determine the natural frequency of undamped system. Also determine the damping ratio and damped natural frequency.

Q.7 Explain Epicentre, Hypocentre and Iso- Seismal.

Q.8 Explain various causes of earthquake with neat sketches.

Q.9 How will you plot the seismograph? Discuss this with a neat sketch of typical Seismograph system.

Q.10 The standard torsion seismograph records trace amplitude 8.5 mm long in N-S direction and 6.1 mm long in E-W direction. The distance to the epicentre is estimated as 112 km.The station correction is +0.2. Determine the magnitude of the earthquake. The distance correction for 112 km is 3.1.

Q.11 What is the mechanism of 'Elastic Rebound Theory of Rupture'?

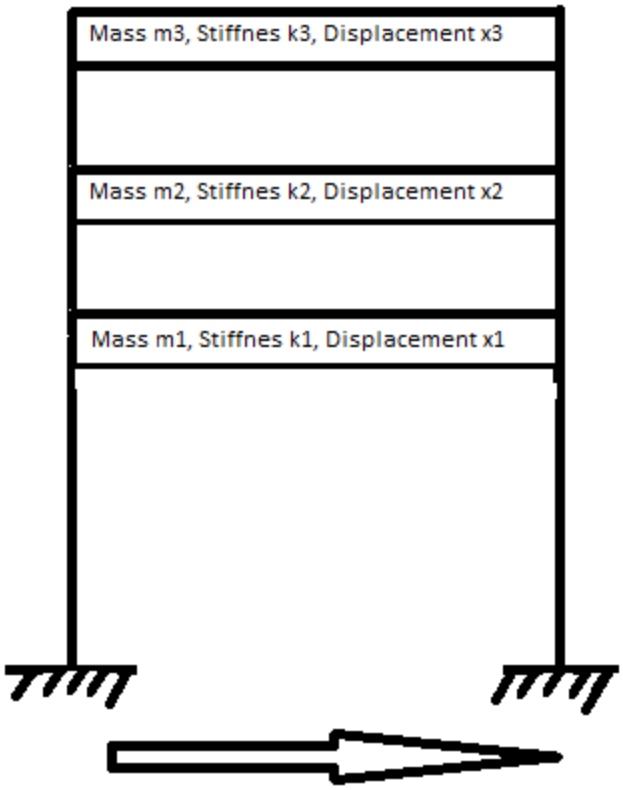
Q.12 Explain underdamping and write equation of displacement using damping factor (ξ) and damped frequency (ω).

Q.13 Explain in detail the different type of seismic waves with the help of their neat sketches.

Q.14 Define Damping Ratio, Critical Damping and Logarithmic Decrement.

Q.15 Write about Internal structure of the earth and explain about Core and lower Mantle.

Q.16 Derive matrix force equation for following 3 degree of freedom system. Consider **free-undamped** vibration.


Mass m3, Stiffnes k3, Displacement x3
Mass m2, Stiffnes k2, Displacement x2
Mass m1, Stiffnes k1, Displacement x1