Printed Pages : 4

ECE064

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : **100858**

Roll No.

B. Tech.

(SEM. VIII) THEORY EXAMINATION, 2014-15

EARTHQUAKE RESISTANT DESIGN OF STRUCTURES

Time : 3 Hours] [Total Marks : 100

Note : (1) Attempt **all** questions.

(2) Use of IS : 1893 (Part I) : 2002 is allowed.

1 Attempt any four parts of the following : 4×5=20

(a) Define the following terms :

(i) Epicentre

(ii) Hypocentre

(iii) Iso-seismal

(iv) Seismograph

(b) Explain various causes of Earthquake with neat sketches.

(c) Differentiate between magnitude and intencity of earthquane.

(d) State assumptions made in earthquake resistant design of structures.

(e) Discuss the types and characteristics of waves generated during earthquake.

(f) The standard torsion seismograph records a trace amplitude 8.5 mm long in N-S direction and 6.1 mm long in E-W direction. The distance to the epicenter is estimated as 112 Km. The station correction is +0.2. Determine the magnitude of the earthquake.

2 **Attempt any four parts of the following :** **4×5=20**

(a) What do you understand by degree of freedom ? Derive the expressions for free vibrations of undamped systems having single degree of freedom; with suitable diagram.

(b) Deriving the suitable expressions explain over damped and under damped systems having single degree of freedom. What is critical damping ?

(c) In an experiment of free-vibration, it is found that the maximum amplitude has reduced to 0.4 times its value in three complete cycles. Determine the percentage damping in the system.

(d) What do you understand by Magnification Factor. Give its properties with the help of curve.

(e) What is equivalent viscous damping ? Describe with suitable expressions and interpret the result.

(f) What is response Spectrum ? Explain how it is developed and its uses.

3 **Attempt any two parts of following :** **2×10=20**

(a) Describe the Holzer method to analyze the MDOF systems.

(b) State Rayleigh's method and derive its expression.

(c) Consider an undamped 'n' degree of freedom system subjected to forced vibration, find the complete solution for displacement.

4 Attempt any two parts of the following : 2×10=20

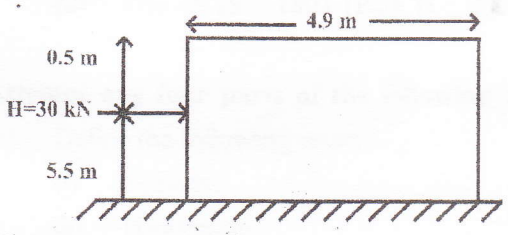
(a) Design an unreinforced 6 m high masonry shear wall as shown, using following data :

Unit weight of wall = 20 kN/m^3

Prism structure of Masonary = 10 Mpa

Seismic force, H = 30 kN.No Superimposed Load.

Assuming wall thickness = 400 mm.



(b) Enumerate the basic 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 I) : 2002 by :

(i) Response spectrum method.

(ii) Time History method.

5 **Attempt any one parts of the following :** **1×20=20**

(a) Enumerate the step by step method for design of foundation for impact type machine as per Indian standard code.

(b) A R.C.C frame consists of beams of span 6 m c/c. A floor inner beam carries a Bending Moment of 450 kNm and a shear force of 325 kN at beam column joint due to gravity and earthquake loads. Design the beam section for ductility.
