Seat No.

Total No. of Pages : 3

B.E. (Civil) (Semester - VII) Examination, December - 2014
EARTHQUAKE ENGINEERING (Elective - I) (New)
Sub. Code : 47903

Day and Date : Wednesday, 17 - 12 - 2014   Total Marks : 100
Time : 2.30 p.m. to 5.30 p.m.

Instructions :
1) Attempt any three questions from each section.
2) Figures to the right indicate full marks.
3) Assume any suitable data whenever necessary.
4) Use of non-programmable calculator and I.S. 1893 : 2002 (Part - I) are allowed.

SECTION - I

Q1) a) Explain the elements of seismology, magnitude and intensity of earthquake. **[6]**

b) Explain in detail Seismograph and its working principle. **[6]**

c) Write a short note on elastic rebound theory. **[5]**

Q2) a) Show that the log - decrement is also given by the equation $\delta = \frac{1}{n} \log\left(\frac{x_0}{x_n}\right)$ where, x_n represents the amplitude after 'n' cycle have elapsed. **[7]**

b) A SDOF vibrating system is having following parameters m = 300 kg, k = 200 N/m, c = 80 N - sec/m. Determine. **[10]**

i) the damping factor.

ii) the natural frequency of damped vibration.

iii) logarithmic decrement (v) the number of cycles after which the original amplitude is reduced to 60%.

P.T.O.

Q3) a) What do you understand by Dynamic Magnification Factors? [4]

b) A simply supported beam of negligible mass spanning 5m supports a machine of 100 kN at center with an unbalanced rotor applying a vertical force of $100 \sin 4t$ kN. The damping force is 0.4 kN-s/m & Flexural rigidity of beam is 20,000 kN-m². Determine: [12]

     i) maximum amplitude of vibration.

     ii) amplitude of vibration at resonance.

Q4) The plane and elevation of a three-storied RCC school building is shown in the figure. The building is located in seismic zone V. The type of soil encountered is medium stiff and it is proposed to design the building with a special moment resisting frame. The intensity of load is 10 kN/m² and the floors are to cater to an imposed load of 3kN/m². Determine the design seismic loads on the structure by static analysis. Storey height of each floor is 3.5 m. [17]
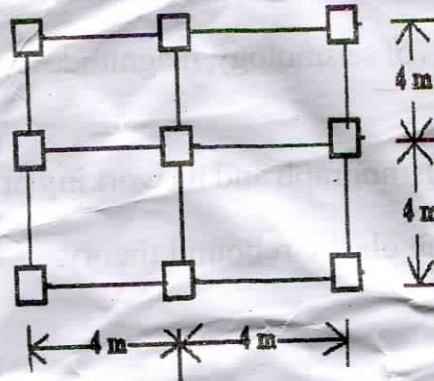
SECTION - II

Q5) a) Philosophy of Earthquake Resistant Design. Give three virtue of good earthquake resistant design. [9]

b) Explain soft storey & discuss its performance of soft storey building in past earthquakes. How will you avoid soft storey? [8]

Q6) a) Explain concept of ductile detailing & explain factor affecting the ductility of structures in detail. [8]

b) Explain ductile detailing of column as per IS 13920 - 1993. [9]

Q7) a) Earthquake resisting features of unreinforced brick masonry structure.

[8]

b) Describe the construction procedure and precautions to be taken for brick-nogged timber frame construction.

[9]

[16]

Q8) Write a short note (**Any Three**):

a) Strengthening of masonry walls.

b) Bond between reinforcing bars and concrete.

c) Strong column and weak beam.

d) Jacketing of column.