S-2442

Total No. of Pages : 3

Seat No.	

B.E.(Civil Engineering) (Part-I) (Semester-VII) (New) Examination, December 2015
EARTHQUAKE ENGINEERING
Sub. Code : 47903

Day and Date : Tuesday, 22 - 12 - 2015 **Total Marks : 100**

Time : 10.00 a.m. to 01.00 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 how subduction zones from and what occurs at such a plate boundary? **[6]**

b) Assume that a seismograph, located 1200 km from the epicenter of an earthquake, records a maximum ground displacement of 15.6 mm for surface waves having a period of 20 seconds. Based on these assumptions, determine the surface wave magnitude. **[6]**

c) Present modified Mercalli scale in a tabular form. **[5]**

Q2) a) Derive the equation of motion and its solution for free damped vibration system. **[8]**

b) A machine foundation weight 60 kN. The spring constants is 11000 kN/m and dashpot (damper) constant C= 200 kN s /m Determine **[8]**

i) whether the system is over damped, undamped or critically damped

ii) logarithmic decrement

iii) damped natural frequency

iv) if the initial displacement is 10 mm and initial velocity is zero, displacement at t=0.1 sec.

P.T.O.

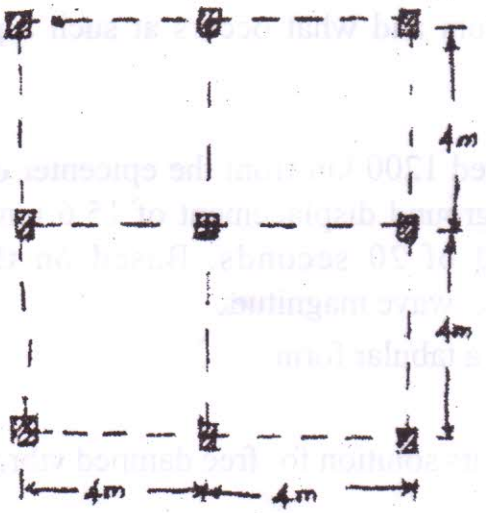
Q3) a) What do you understand by Dynamic Magnification Factors? **[4]**

b) A simply supported beam of negligible mass spanning 6 m supports a machine of 50 kN at center with an unbalanced rotor applying a vertical force of 60 sin 5t kN. The damping force is 0.3 kN - s/m & Flexural rigidity of beam is 25000 kN-m^2. Determine **[12]**

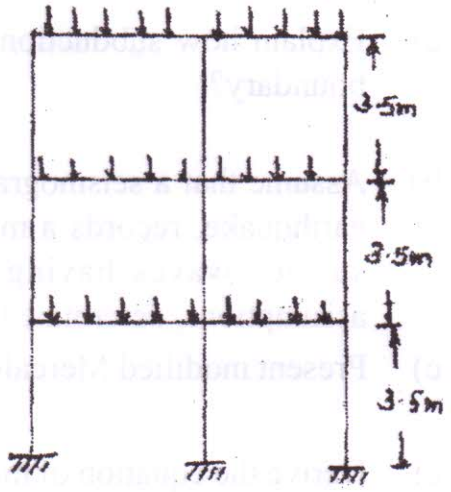
i) maximum amplitude of vibration

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 8 kN/m^2 and the floors are to cater to an imposed load of 4 kN/m^2. Determine the design seismic loads on the structure by static analysis. **[17]**



PLAN



ELEVATION

SECTION-II

Q5) a) When is a soft storey created in a building? How does it affect the earthquake resistance of the building? **[8]**

b) Simplicity and symmetry is the key to making a building earthquake resistant. Explain. **[9]**

Q6) a) Explain ductile detailing of column as per IS 13920 - 1993. **[8]**

b) Design the column of a multistoried building for ductility with M 25 and Fe 415 subjected to an axial force of 2000 kN and bending moment of 416.67 kNm. **[9]**

Q7) a) What is the influence of opening in masonry building? **[8]**

b) Describe briefly with neat sketches Stud Wall construction. **[8]**

Q8) Write a short note (Any Three) **[16]**

a) Strong column and weak beam.

b) Effect of transverse reinforcement.

c) Beam jacketing.

d) Effect of discontinuity in load path.

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