

K-147

Total No. of Pages :3

Seat No.	
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B.E. (Civil)-I Examination, 2013
EARTHQUAKE ENGINEERING (Revised)
Sub. Code : 47903

Day and Date : Monday, 10-06-2013

Total Marks :100

Time : 2.30 p.m. to 5.30 p.m.

- Instructions :
- 1) Attempt any three questions from each section.
 - 2) Use of non-programmable scientific calculator and only IS 1893 (Part I): 2002 is allowed.
 - 3) Figures to the right indicate full marks.
 - 4) Assume suitable data if necessary and mention it clearly.

SECTION-I

- Q1) a) Write note on interior of earth. [5]
b) What are strong ground motion and its characteristics? [5]
c) The architect and the structural engineer must coordinate at the planning stage of the building. Comment. [6]
- Q2) a) Write step by step procedure for construction of site dependent response spectrum. [5]
b) An SDOF system is excited by a sinusoidal force. At resonance the amplitude of displacement was measured to be 2 cm. At an excitation frequency of one-tenth the natural frequency of the system, the displacement was measured to be 0.2 cm. Estimate the damping ratio of the system. [11]
- Q3) a) Write note on static deflection. [3]
b) An air-conditioning unit weighing 500 kg bolted at the middle of two parallel simply supported steel beams as shown in the Fig.1. The clear span of the beams is 2.4m. The second moment of cross-section area of each beam is $4 \times 10^6 \text{ mm}^4$. The motor in the unit runs at 300 rpm and produces an unbalanced force of 25000 kg at this speed. Neglect the weight of the beams and assume 1% viscous damping in the system. Determine the amplitudes of steady state deflection and force transmitted

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to the beams at their mid-points which result from the unbalanced force.
 For steel $E=2 \times 10^5 \text{ N/mm}^2$. [14]

Air Conditioning

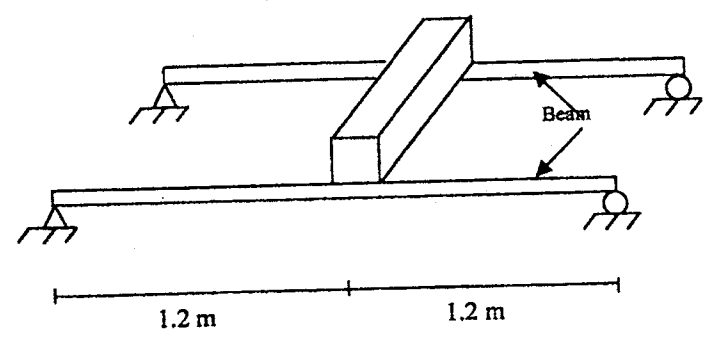


Fig. 1

Q4) It is proposed to construct a two storied television station building having plan dimensions as shown in Fig.2, in very severe zone, with following data. No internal walls are constructed. Determine the lateral forces and base shear.

- i) Height of each floor - 3.2 m
- ii) Size of all columns - 300 mm x 300 mm
- iii) Size of all beams - 230 mm x 450 mm
- iv) Thickness of slab - 120 mm
- v) Thickness of exterior walls - 230 mm
(Stiffness not to be considered)
- vi) Live load on floor - 5.5 kN/m²
- vii) Strata - Hard rock
- viii) Damping in structure - 2%
- ix) Type of frame - SMRF

[17]

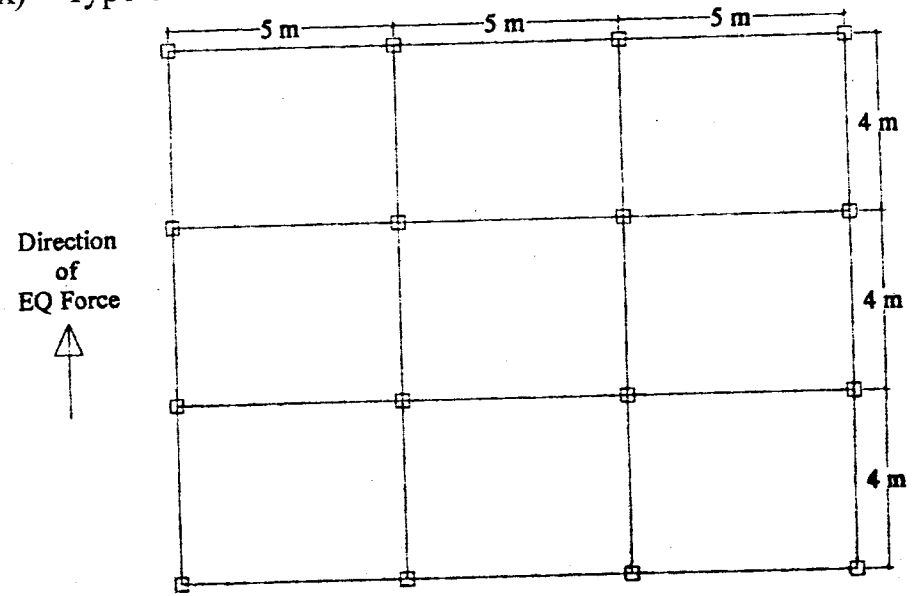


Fig. 2

SECTION-II

- Q5) a) What are the planning aspects required for earthquake resistance design of structure? [8]
b) Differentiate between behavior of unreinforced and reinforced masonry. [8]
- Q6) a) Write note on ductility. What are the techniques to improve the ductility of RCC structure? [8]
b) What special precautions should be exercised during planning and construction of openings on a masonry wall? [8]
- Q7) a) Why are short column more damaged during earthquake? How the damage can be minimized? [8]
b) Write detailed note on R.C. bands in masonry building. [9]
- Q8) a) Write detailed note on stud wall construction. [10]
b) Write note on repairs and strengthening. [7]

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