

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -2 EXAMINATION - 2018

B.Tech VIII / M.Tech II Semester

COURSE CODE: 12M1WCE213

MAX. MARKS: 25

COURSE NAME: Earthquake Resistant Design of Structures

COURSE CREDITS: 3

MAX. TIME: 1.5 HRS.

Notes: All questions are compulsory. Carrying mobile phone during examinations will be treated as case of unfair means. For any missing data or information, you are free to make whatever simplifying assumptions that you wish, provided you supply a credible justification. IS1893 (I)-2016 is allowed in examination hall.

- Q1 Consider a four-storey reinforced concrete office building shown in **Fig # 1**. The building is to be constructed at Chandigarh. The soil conditions are medium stiff and the entire building is to be supported on a raft foundation. The RC frames are infilled with brick masonry. The lumped weight due to dead loads is 15 kN/m² on floors and 12 kN/m² on the roof. The floors are to cater for a live load of 4 kN/m² on floors and 2 kN/m² on the roof. **CO 1**
CO 2
CO 3
10 M

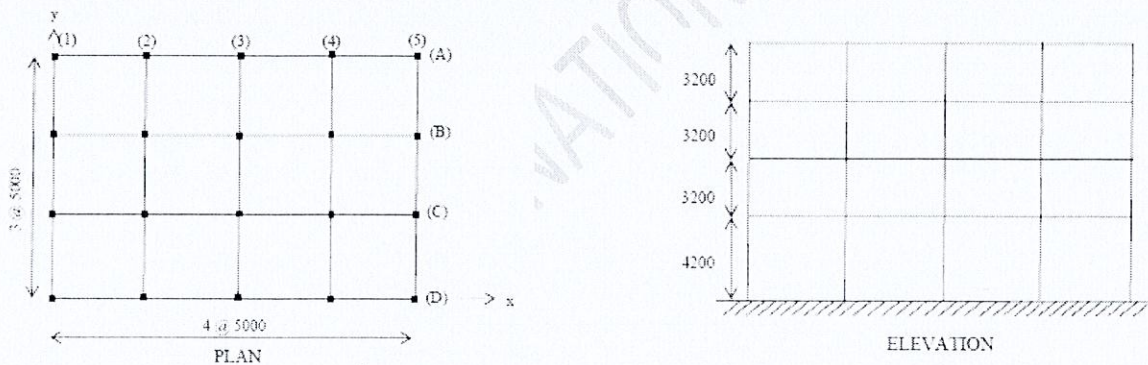


Fig # 1 (dimensions are given in mm)

Determine the natural periods and associated mode shapes for vibration in X direction. (Show your calculation for first and second mode shape only).

- Q2 For the previous problem 3rd natural period is given as 0.145 sec. and associated mode shape is $[1 \ -0.83 \ -0.57 \ 1.02]^T$. Determine the seismic force in X direction using Response Spectrum Analysis. **CO 3**
CO 4
10M
- Q3 Explain the following terms related to Earthquake Engineering **CO 1**
CO 2
CO 4
5 M
- MCE
 - DBE
 - Modal Mass
 - Orthogonality condition of mode shape vectors.