

Enrollment No: \_\_\_\_\_

Exam Seat No: \_\_\_\_\_

# C. U. SHAH UNIVERSITY

## Summer Examination-2022

Subject Name : Geology and Earthquake Engineering

Subject Code : 4TE06GEE1

Branch: B.Tech (Civil)

Semester: 6

Date: 05/05/2022

Time: 02:30 To 05:30

Marks: 70

Instructions:

- (1) Use of Programmable calculator & any other electronic instrument is prohibited.
- (2) Instructions written on main answer book are strictly to be obeyed.
- (3) Draw neat diagrams and figures (if necessary) at right places.
- (4) Assume suitable data if needed.
- (5) IS 1893(1)-2002 is allowed.

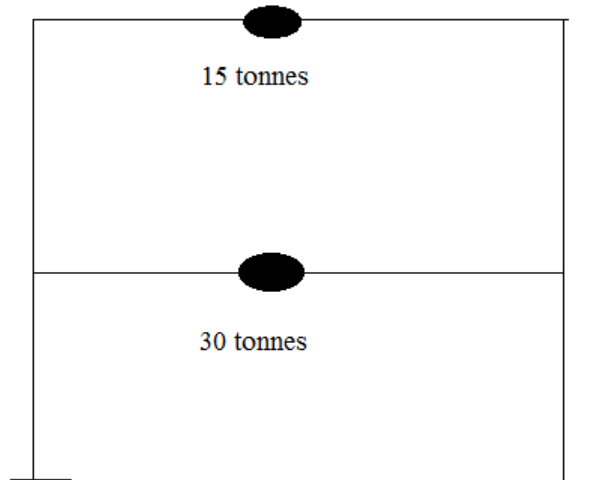
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- Q-1 Attempt the following questions: (14)**
- a) According to IS: 1893 (part-I)-2002, the ratio (I/R) shall not be greater than \_\_\_\_\_ 1
  - b) A building is located on the boundary of zone IV & V so building will be designed in zone IV & V? 1
  - c) What is monoclinic system in mineralogy? 1
  - d) S-wave can travel through liquid only. It's true or fall? 1
  - e) What is PGA? 1
  - f) R.C frame building is more ductile as compared to Steel Frame Building? 1
  - g) **Define the following terms:** 8  
Earthquake Intensity, Single degree of freedom (SDOF), Ductility, Torsional effect, Resonance, Oscillation, Homoseismal line, Focal region

**Attempt any four questions from Q-2 to Q-8**

- Q-2 Attempt all questions (14)**
- (a) Derive the equation of motion for the free damped single degree of freedom system. 7
  - (b) Explain box action of masonry wall. 4
  - (c) Explain in brief base isolation technique. 3
- Q-3 Attempt all questions (14)**
- (a) Explain the earthquake resistance feature of masonry structures. 7
  - (b) Explain in brief soil liquefaction phenomenon. 4
  - (c) Write brief note on pounding effect. 3
- Q-4 Attempt all questions (14)**
- (a) A model of two story RCC frame is shown in figure-1. Determine the natural frequency. Assuming the beam column joint to be rigid, for the 7



following data: Column dimension is  $250 \times 250$  mm and story height is 3m.



**Figure-1, Q-4(a)**

- (b) If a building is to be constructed on the slope of a hilly area, what precautions will have to be exercised during planning of the building to avoid twisting? 7
- Q-5 Attempt all questions** (14)
- (a) Explain dip and strike, anticline and syncline with neat sketch. 7
- (b) What are the causes and effects of liquefaction? 7
- Q-6 Attempt all questions** (14)
- (a) Enlist the physical properties of mineral and explain any two properties in details. 8
- (b) Write brief note on seismic dampers. 6
- Q-7 Attempt all questions** (14)
- Analyze the building frame shown in figure.2 by approximate method and draw shear force, bending moment and axial force diagrams. 14



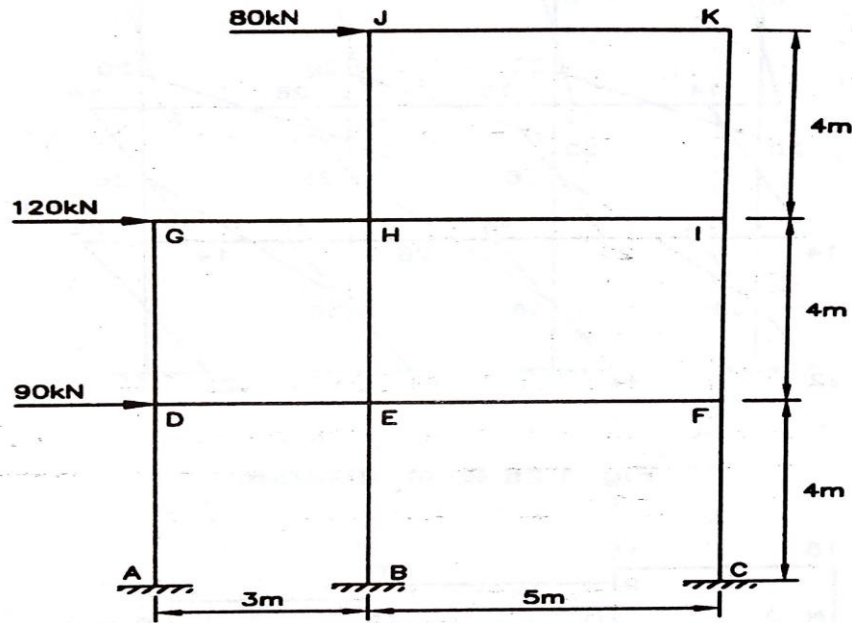


Figure 2. Q-7

Q-8

(14)

A 10-storey OMF building has plan dimension as shown in figure-3. The storey height is 3.0 m. The DL per unit area of the floor, consisting of the floor slab, finishes etc., is  $4 \text{ kN/m}^2$ . Weight of the partitions on the floor can be assumed to be  $2 \text{ kN/m}^2$ . The intensity of live load on each floor is  $3 \text{ kN/m}^2$  and on the roof is  $1.5 \text{ kN/m}^2$ . The soil below the foundation is hard and the building is located in Delhi. Determine the seismic forces and shears at different floor levels.

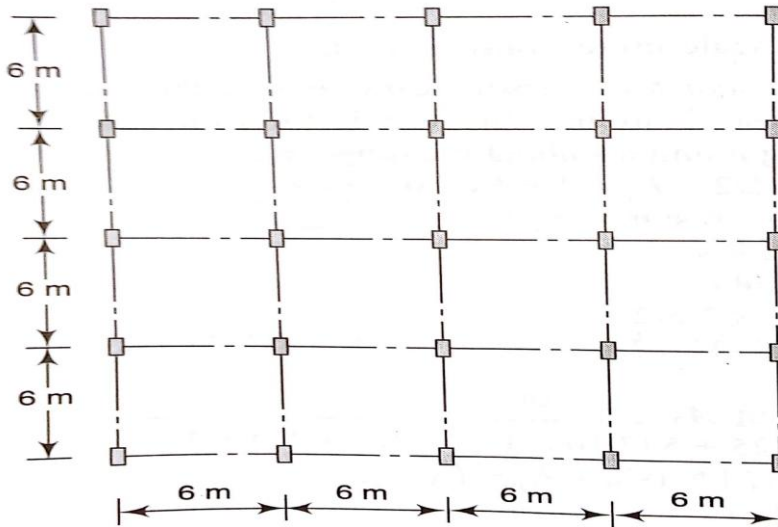


Figure 3. Q-8

