BIRLA INSTITUTE OF TECHNOLOGY & SCIENCE, PILANI

First Semester (2022-23) COMPREHENSIVE EXAMINATION (OPEN BOOK)

Course No. CE G618 Date: 22/12/2022

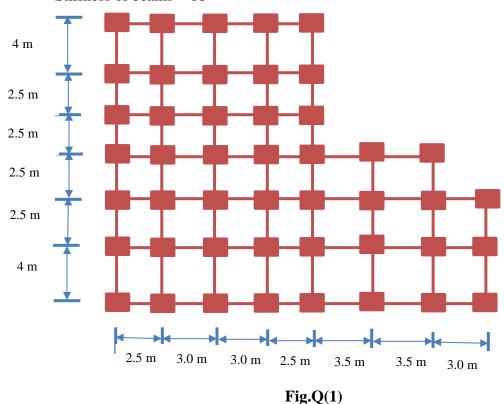
Course Title: Design of Multi-storeyed Structures Max Marks: 90

Duration: 120 minutes

Q.1 Compute the rigidities of the bents in both the principal directions of the plan shown in Fig.Q1.

Stiffness of interior columns = 9.0 Stiffness of exterior columns = 4.5

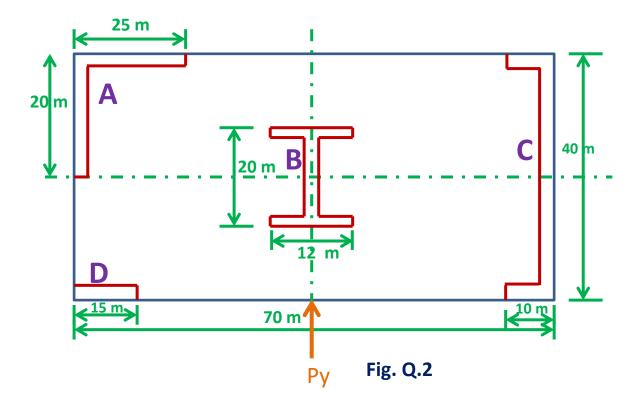
Stiffness of beams = 18



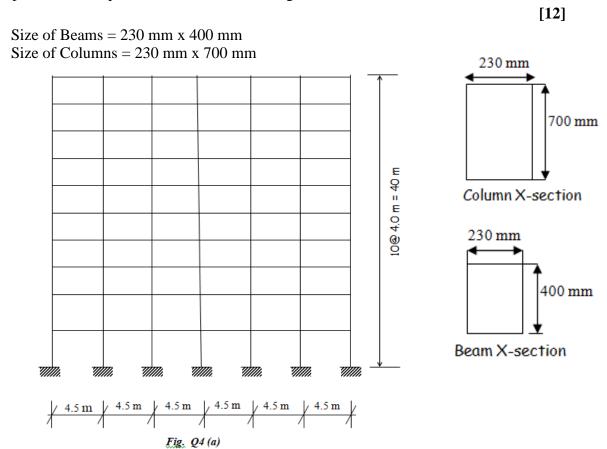
Also compute the center of rigidity with respect to lower left corner of the plan.

Q.2 Fig.Q2 gives floor plan of a shear walled multistoried structure consisting of three shear walls (A, B, C & D) made of M30 grade of concrete. The horizontal shear in the storey under consideration is denoted by P_y acting on its long side along the center line of the building. The storey height is taken as 3 m. It is required to compute the shear center of the structure. Wall thickness is 230 mm everywhere.

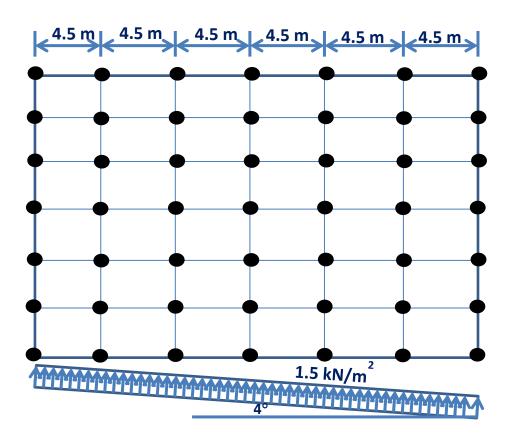
[10]



Q.3 A 10 storeyed building has 6 bays at 4.5 m spacing as shown in *Fig. Q4(a)*. Calculate the drift at the top under a wind pressure of 1.5 kN/m^2 . M40 grade of concrete has been used in construction.



Q.4 (b) gives the line plan of the above building. However direction of wind has been changed now and it is shown in the figure. Now you have four shear walls (150 mm thick and 7 meter long). You are required to locate these shear walls with proper orientation on the plan. [8]



Q.4 For the tower Shown in Fig.Q4

- i) Compute the support reactions at Support M & N [6]
- ii) Find the forces in the members HJ,HI & GI as indicated in the Fig.Q4 [24]

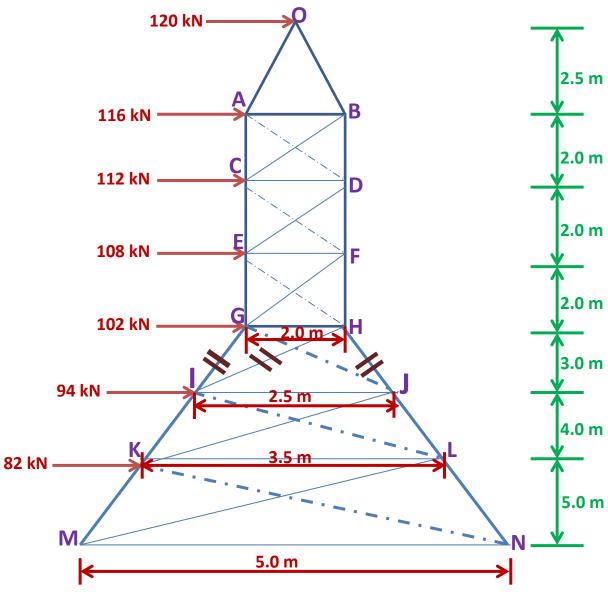


Fig.Q4