

## Fourth year

### Design of steel structure 2

#### Test No 1

Answer the following two questions

#### Question one:

**6** A column between floors of a multi-story building frame is subjected to biaxial bending at the top and bottom. The column member consists of a Grade 43 steel  $305 \times 305$  UC 158 section. Investigate its adequacy if the design load data are as follows:

Ultimate axial compression  $= 2300 \text{ kN}$

Ultimate moments,

Top—about major axis  $= 300 \text{ kNm}$

—about minor axis  $= 50 \text{ kNm}$

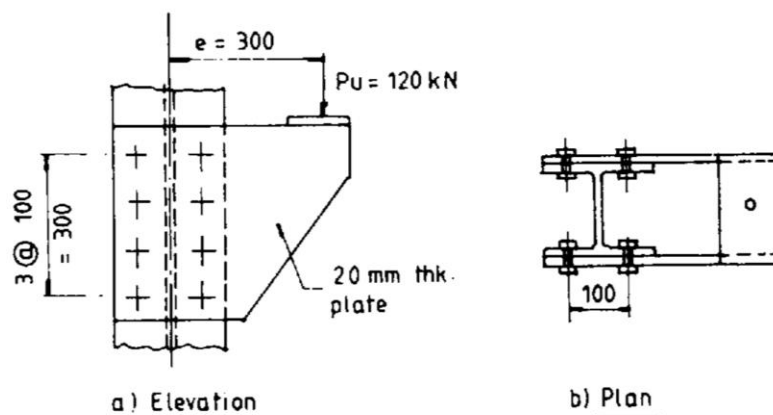
Bottom—about major axis  $= 150 \text{ kNm}$

—about minor axis  $= -80 \text{ kNm}$

Effective length of column  $= 6.0 \text{ m}$

#### Question two:

**4.3** A bolted eccentric connection (illustrated in Figures 4.33(a) and (b)) is subjected to a vertical ultimate load of  $120 \text{ kN}$ . Determine the size of Grade 4.6 bolts required if the load is placed at an eccentricity of  $300 \text{ mm}$ .



**Figure 4.33**