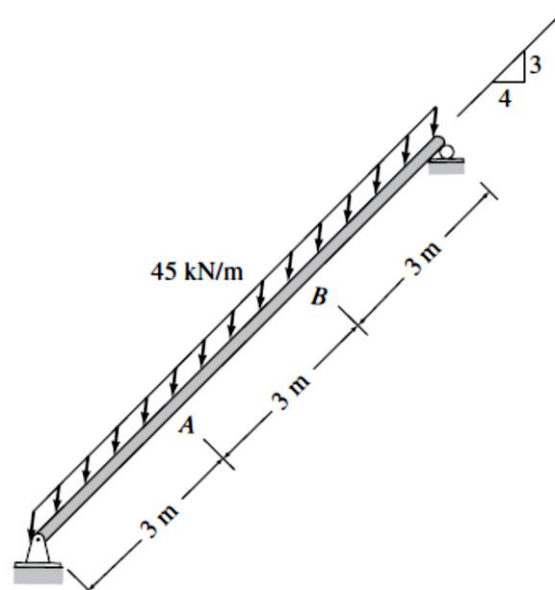
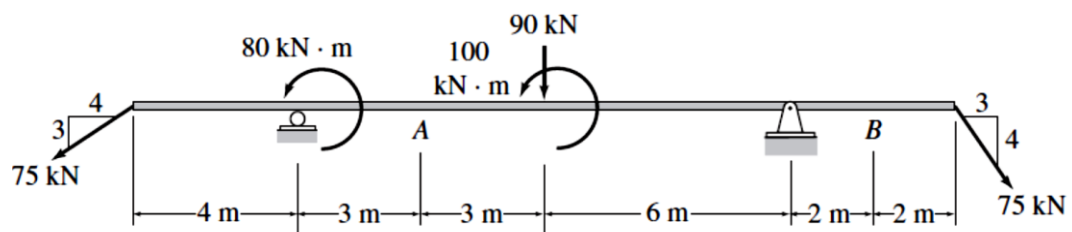
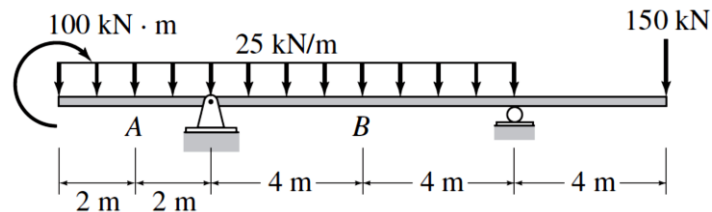
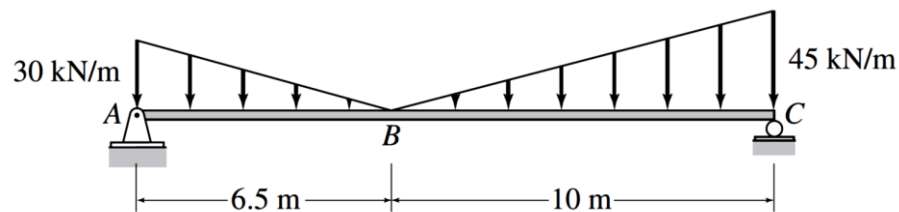


1- Determine the axial forces, shears, and bending moments at points A and B of the structures shown.

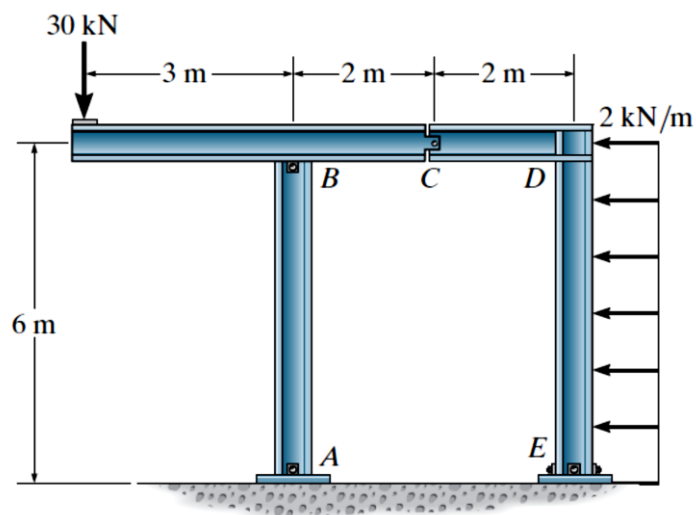


2- Determine the equations for shear and bending moment for the beam shown. Use the resulting equations to draw the shear and bending moment diagrams.



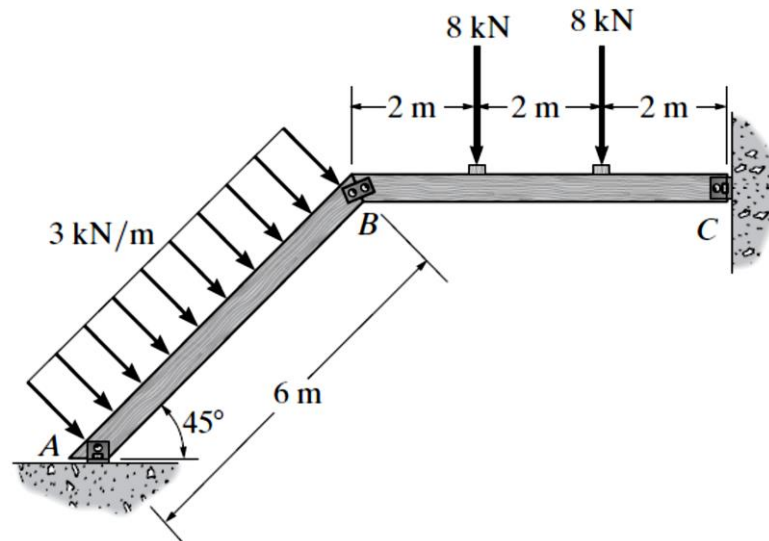
Ref: Kassimali A., Structural Analysis, SI Edition, 5th Ed. CL Engineering, 2014

3- Draw the moment diagrams for the frame. Assume the frame is pin connected at A, B, and C and fixed connected at E and D.



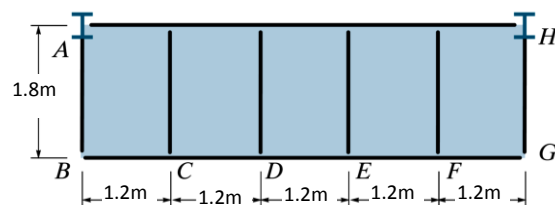
Ref: Hibbeler, R.C., Structural Analysis, 10th Ed., Pearson Prentice Hall, 2017.

4- Draw the shear and moment diagrams for each member of the frame. The members are pin connected at A, B, and C.



Ref: Hibbeler, R.C., Structural Analysis, 10th Ed., Pearson Prentice Hall, 2017.

5- The balcony located on the third floor of a motel is shown in the photo. It is constructed using a 4-in.-thick concrete (plain stone) slab which rests on the four simply supported floor beams, two cantilevered side girders AB and HG, and the front and rear girders. The idealized framing plan with average dimensions is shown in the adjacent figure.

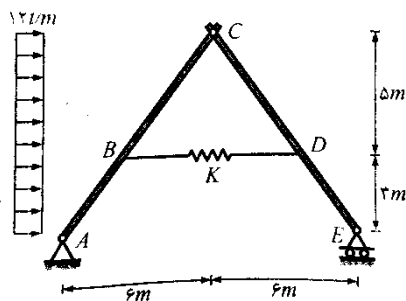


According to local code, the balcony live load is 3 kN/m^2 . Draw the shear and moment diagrams for the front girder BG and a side girder AB. Assume the front girder is a channel that has a weight of 350 N/m and the side girders are wide flange sections that

have a weight of 500 N/m. Neglect the weight of the floor beams and front railing. For this solution treat each of the five slabs as two-way slabs.

Ref: Hibbeler, R.C., Structural Analysis, 10th Ed., Pearson Prentice Hall, 2017.

۶- اعضای خمشی AC و CE در نقطه ی C توسط مفصل به یکدیگر متصل شده‌اند. در صورتی که نقاط B و D مطابق شکل توسط فنری به سختی $K=20\text{ton/cm}$ به یکدیگر اتصال یابند و سازه تحت اثر نیروی گسترده‌ی 12ton/m مطابق شکل قرار گیرد، تغییر طول فنر برابر است با:



- (۱) ۴ سانتیمتر افزایش طول
- (۲) ۱,۵۷ سانتیمتر کاهش طول
- (۳) ۱,۹۲ سانتیمتر افزایش طول
- (۴) فنر تغییر طول نخواهد داشت

مرجع: آزمون کارشناسی ارشد ۷۲