Arab Academy for Science, Technology & Maritime Transport.
College of Engineering & Technology,
Mechanical Engineering Department.

Stress analysis (ME 276)
Sheet No. 6.

(1) The loaded beam shown in **Figure 1** is made of southern pine for which E = 13 GPa. Determine the slope of deflection at points A, B and C and the deflection/displacement at point A.

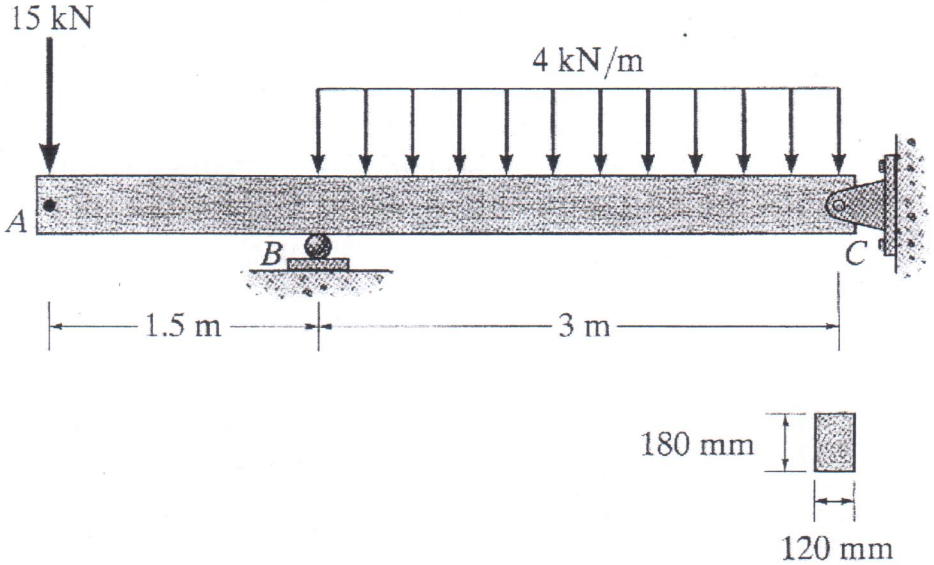

Figure1.

(2) The loaded beam shown in **Figure 2** is made of A-36 steel for which E = 200 GPa and $I = 70 \times 10^6$ mm^4. Determine the displacement at C and the slope at A and B.

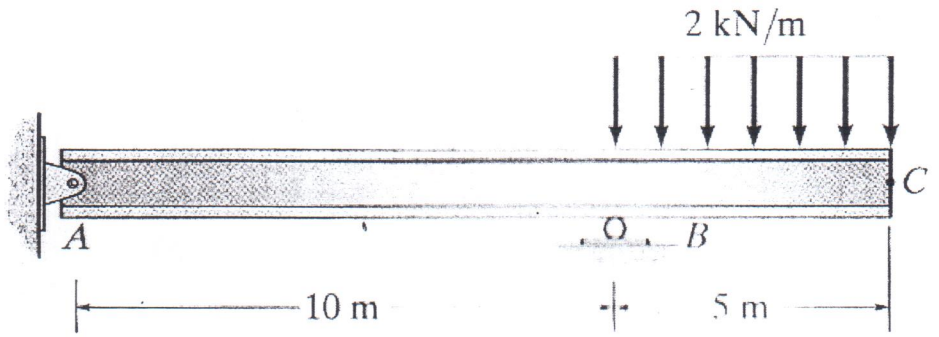

Figure 2.

(3) For the loaded beam shown in **Figure 3** derive the equation of the elastic curve. ***EI*** is constant. Determine, in terms of ***EI***, the displacement at the both ends of the beam and the maximum displacement.

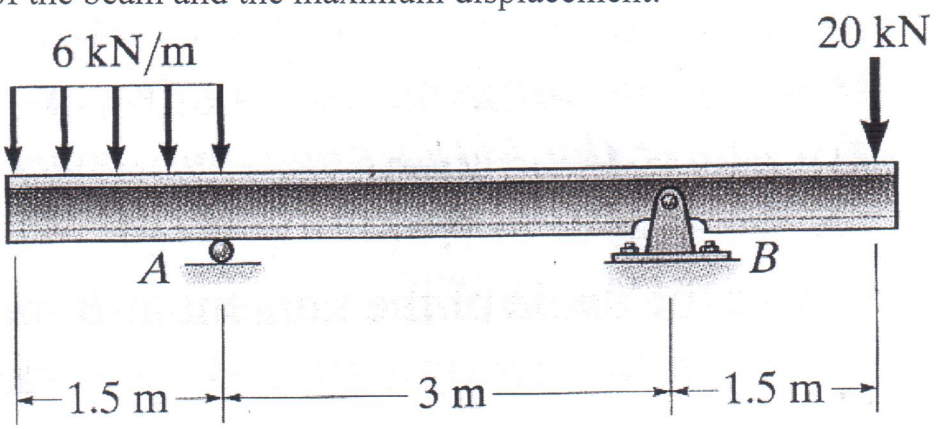

Figure 3.

(4) Derive the equations of the slope and elastic curve for the loaded beam shown in **Figure 4**. ***EI*** is constant. Determine the following in terms of ***EI***:

a. The slope of deflection at ***A*** and ***B***,

b. The deflection/displacement at the right end of the beam and at the midpoint between ***A*** and ***B***.

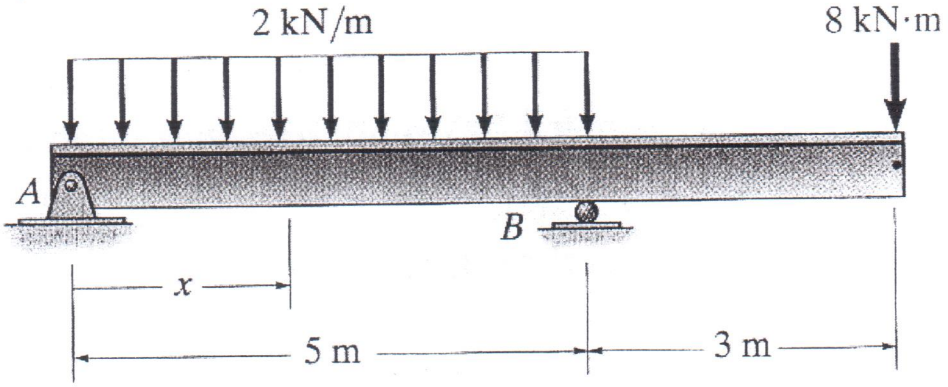

Figure 4.

(5) Determine the equation of the elastic curve of the simply supported beam which is illustrated in **Figure 5** and then find the maximum deflection. The beam is made of wood having a modulus of elasticity ***E*** = 10 GPa.

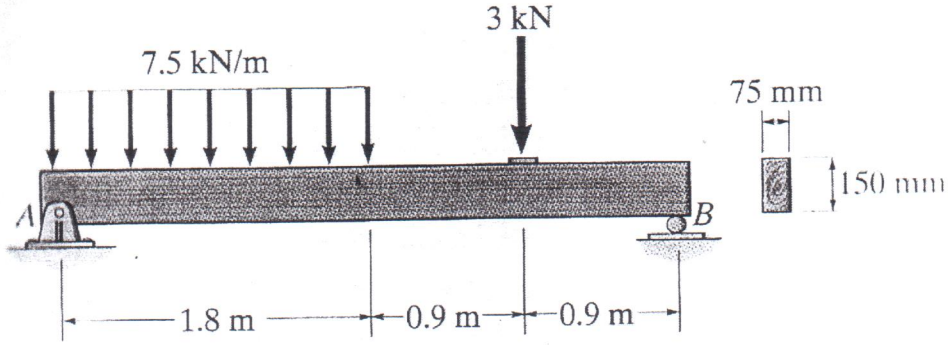

Figure 5.

(6) For the loaded wooden beam shown in **Figure 6** determine the equation of the elastic curve. If the modulus of elasticity E_w = 12 GPa, determine the deflection and the slope at end ***B***.

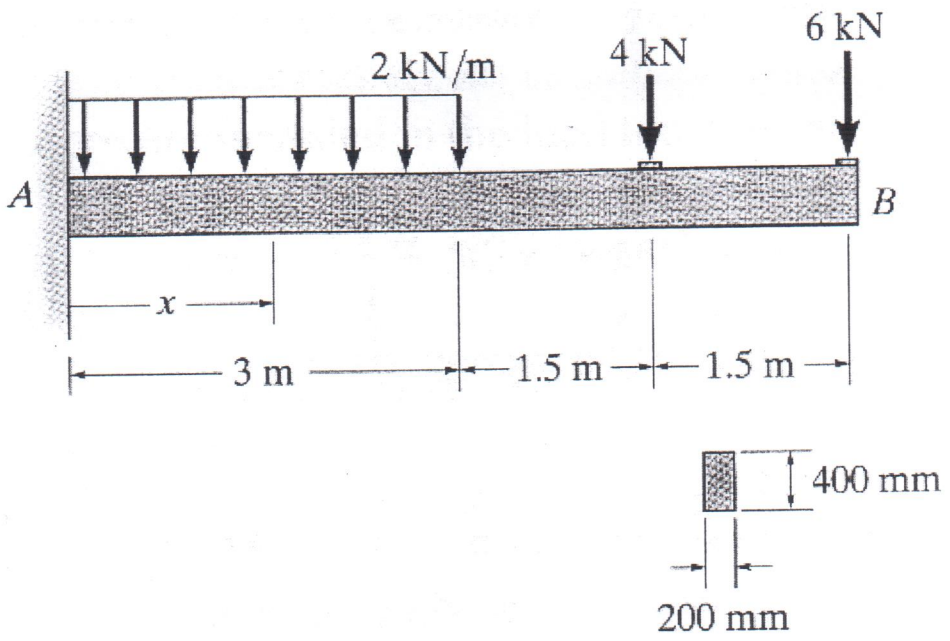

Figure 6.

(7) For the beam shown in **Figure 7** determine the slopes at ***A*** and ***B*** and the displacement at ***C***. ***EI*** is constant.

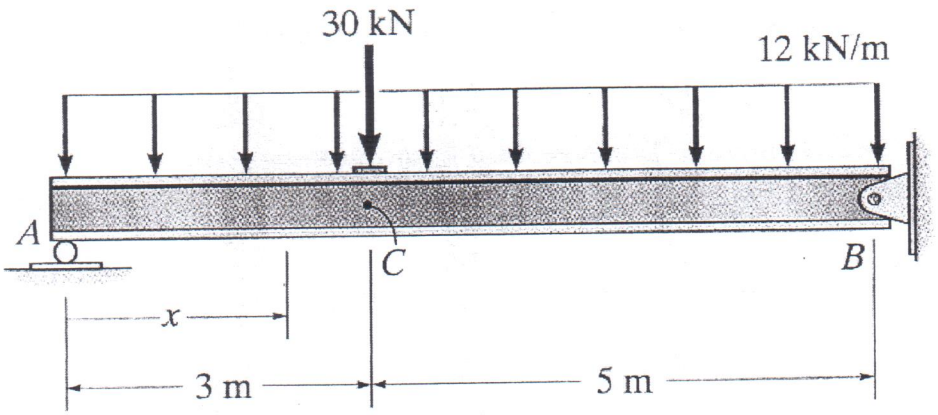

Figure 7.

(8) For the beam shown in **Figure 8** determine the displacement at $X = 7$ m and the slope at A. EI is constant.

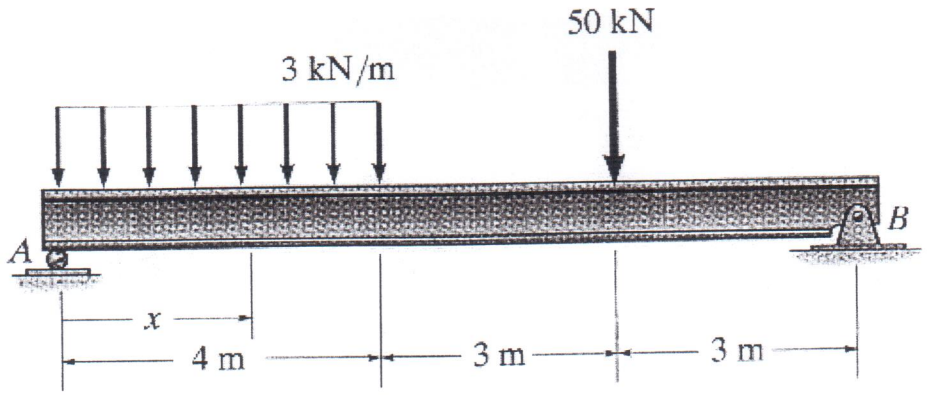

Figure 8.

(9) For the beam shown in **Figure 9** determine the displacement at $X = 1.5$ m and the slopes at A and B. EI is constant.

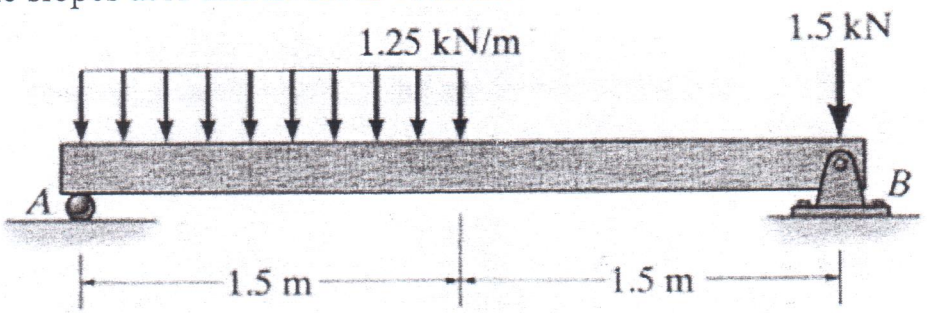

Figure 9

(10) Derive the equations of the slope and elastic curve for the loaded beam shown in **Figure 10**. EI is constant. Determine the following in terms of EI:

a. The slope of deflection at A and B,

b. The deflection/displacement at the lift end of the beam and at the midpoint between A and B.

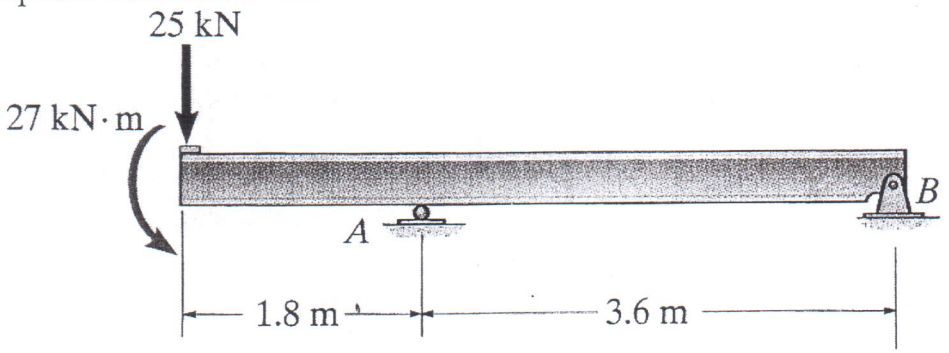

Figure 10.

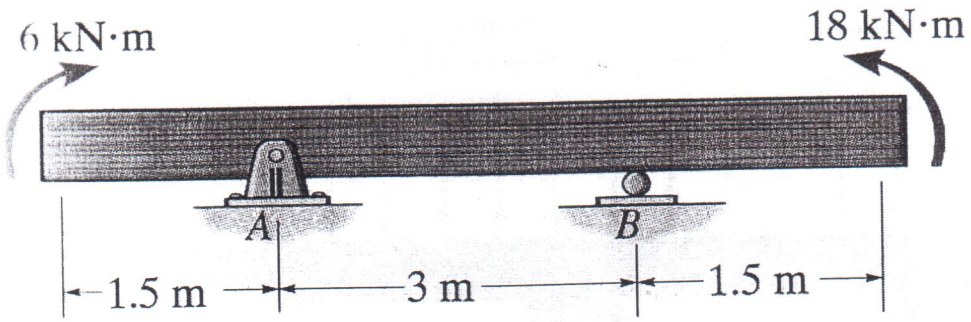

Figure 14.

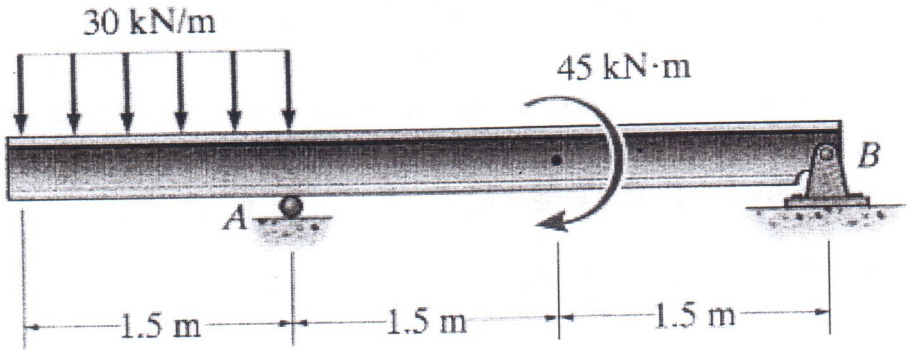

Figure 15.

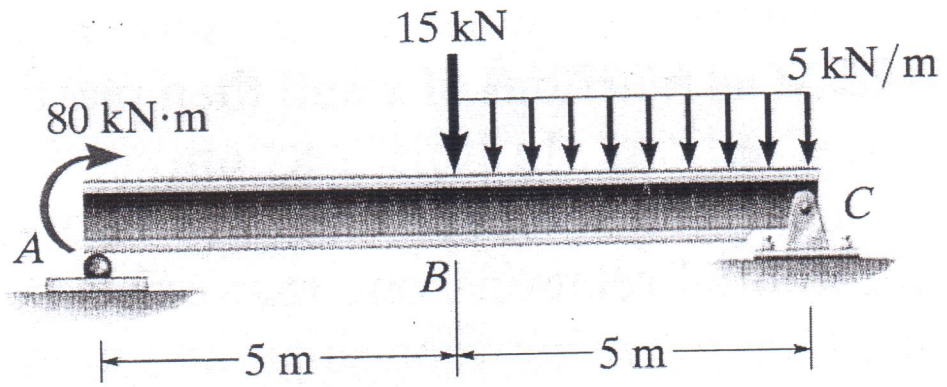

Figure 16.

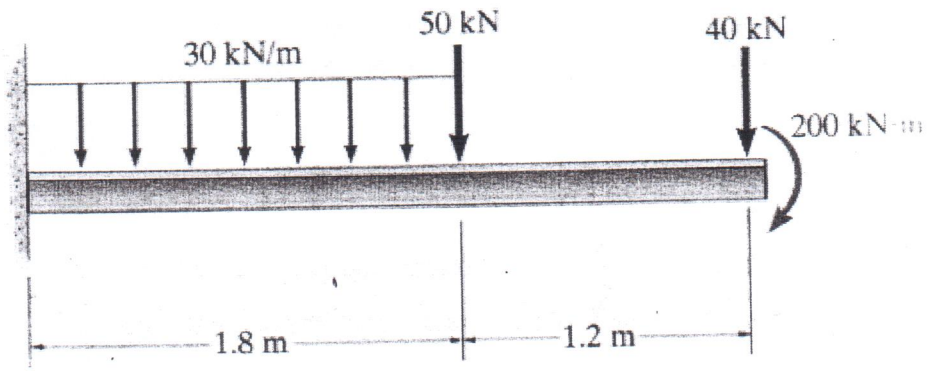

Figure 17.

(11) For the beams and cantilevers shown in **Figures 11 to 17** Derive the equations of the slope and elastic curve and hence determine, in terms of ***EI***, the maximum displacement.

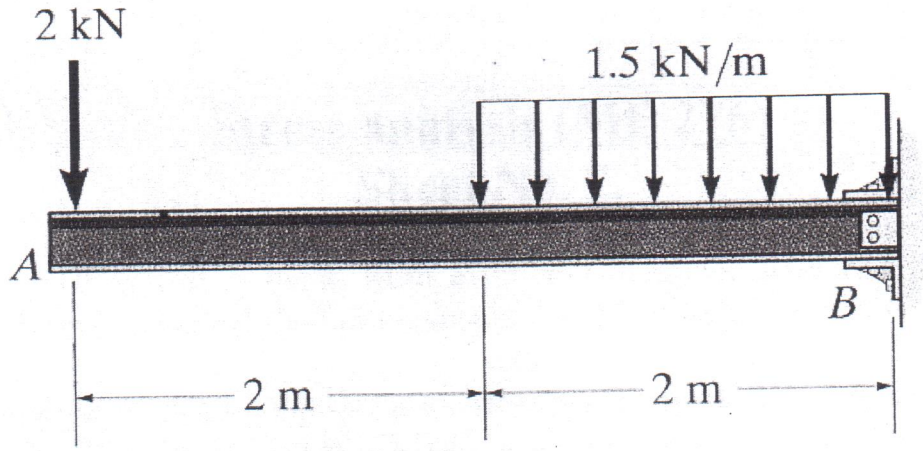

Figure 11.

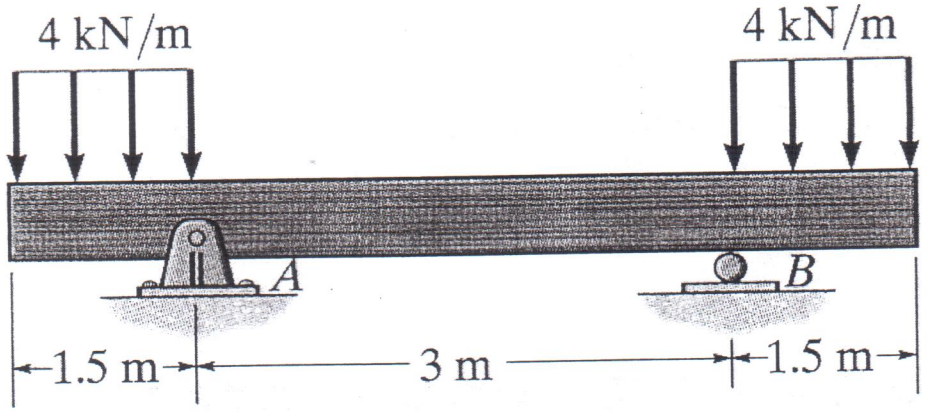

Figure 12.

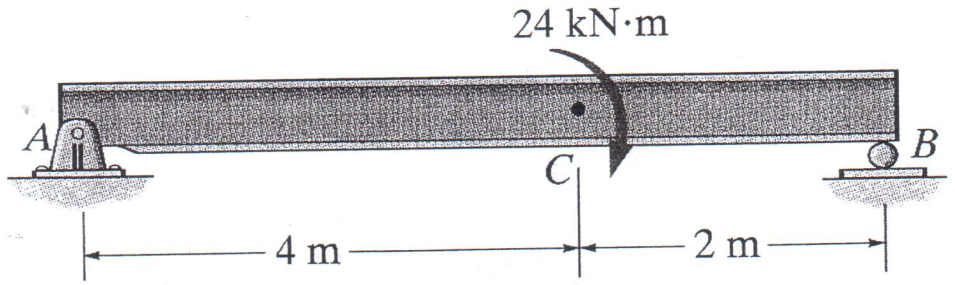

Figure 13.