Maximum value of function (Moving load)

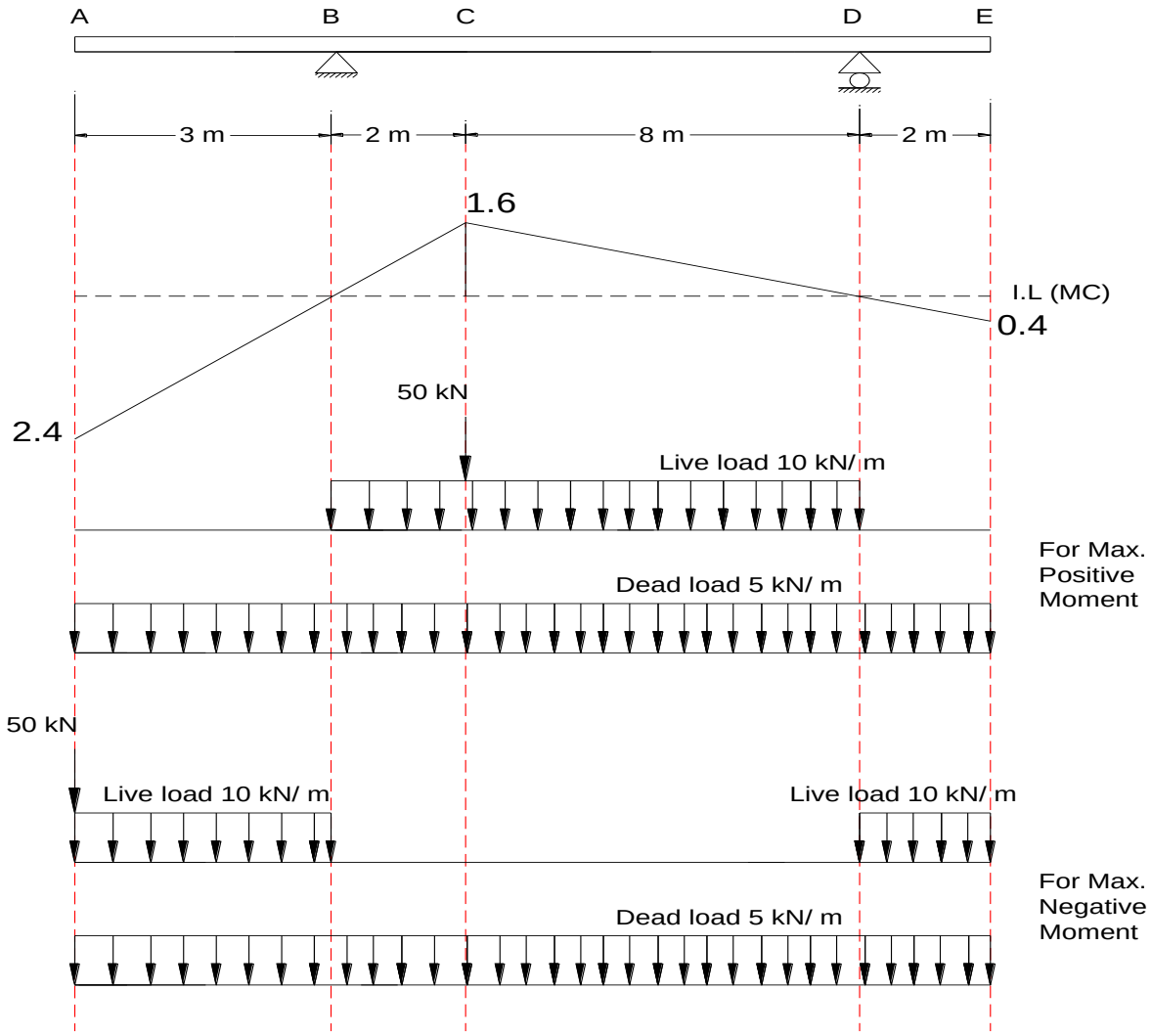
1- for concentrated load P (kN)

F_{max} = p *max. Ordinate of I.L

2- For uniform load W (kN/m)

F_{max} = W * Area of I.L

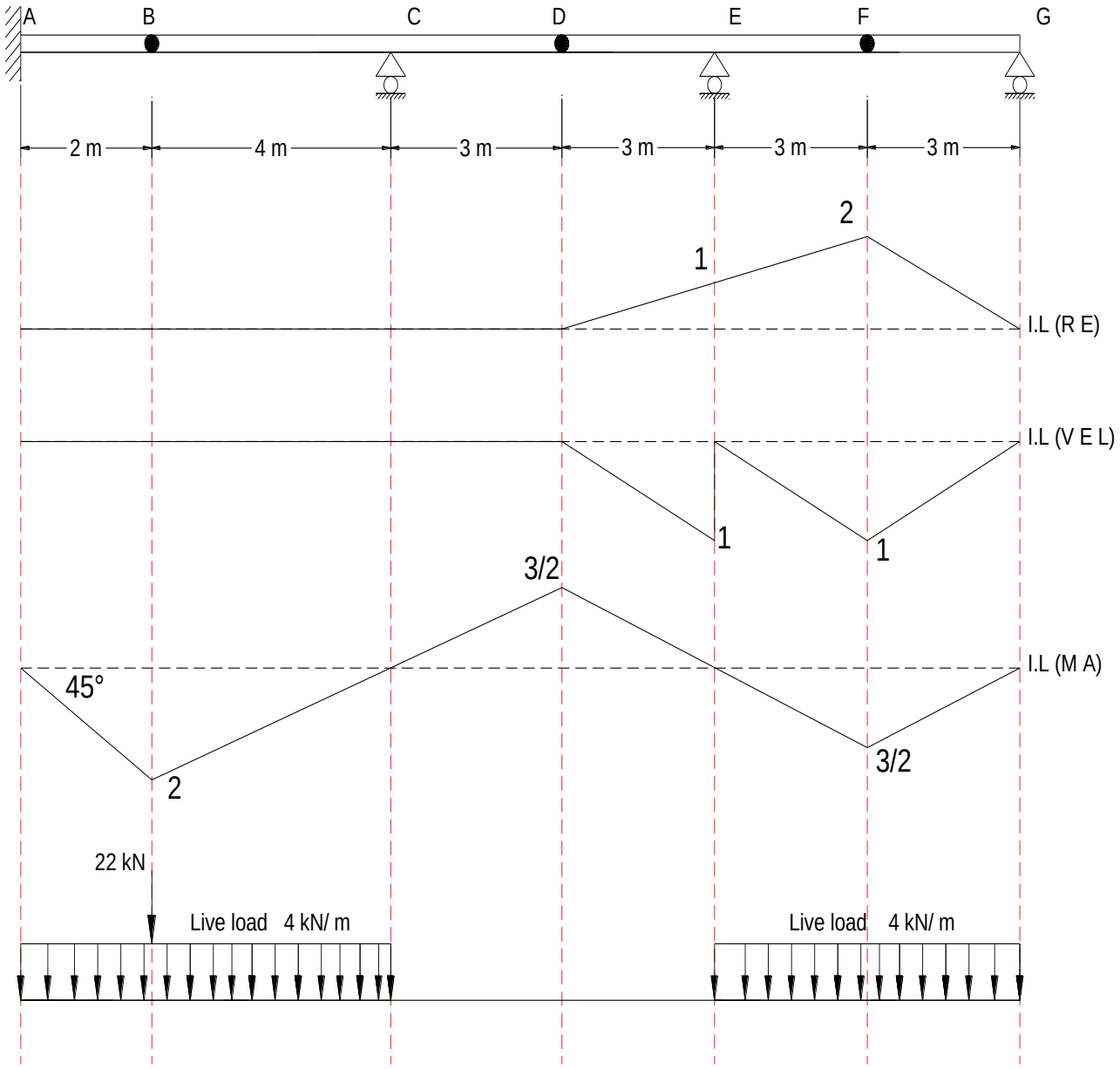
EX1: find max Positive and max Negative bending moment at (c) due to a moving concentrated load 50 kN, a uniform live load 10 kN/m, a uniform dead load 5 kN/m.



$$\text{MC max. (positive)} = (50 * 1.6) + 10 * \left(\frac{1.6*10}{2}\right) + 5 * \left(\frac{1.6*10}{2} - \frac{2.4*3}{2} - \frac{0.4*2}{2}\right) = 180 \text{ kN. m}$$

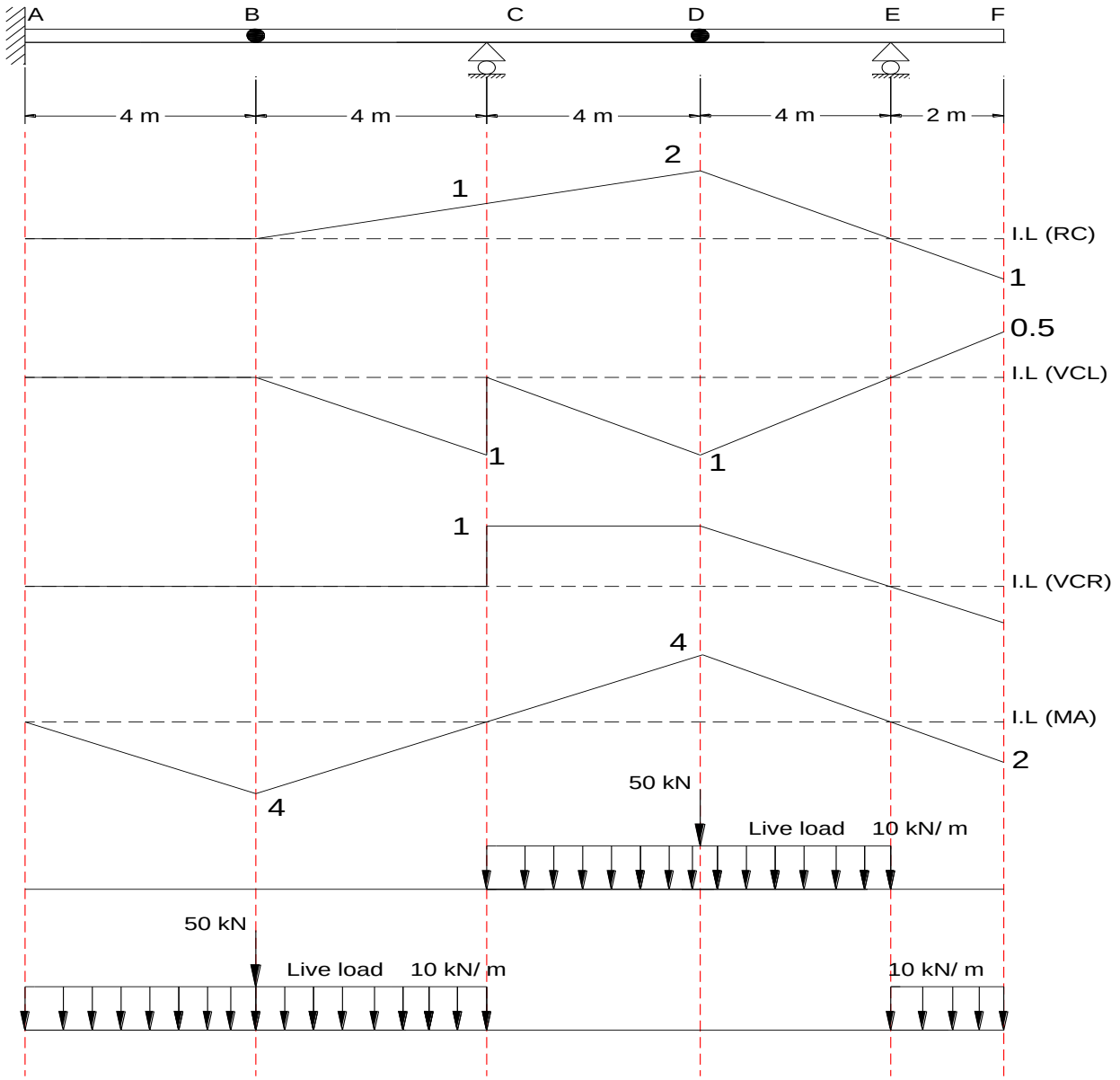
$$\text{MC max. (Negative)} = (50 * -2.4) + 10 * \left(-\frac{2.4*3}{2} - \frac{0.4*2}{2}\right) + 5 * \left(\frac{1.6*10}{2} - \frac{2.4*3}{2} - \frac{0.4*2}{2}\right) = -140 \text{ kN. m}$$

EX2: Draw the I.L for (RE, VEL and MA) then find max Negative bending moment at (A) due to a moving concentrated load 22 kN, a uniform live load 4 kN/m.



$$\text{MA max(Negative)} = (22 * -2) + 4 * \left(-\frac{2 * 6}{2} - \frac{1.5 * 6}{2}\right) = -86 \text{ kN. m}$$

EX3: Draw the I.L for (RC, VCL, VCR and MA) then find max positive and mx Negative bending moment at (A) due to a moving concentrated load 50 kN, a uniform live load 10 kN/m.



$$\text{MA max(positive)} = (50 * 4) + 10 * \left(\frac{4*8}{2}\right) = 360\ kN.m$$

$$\text{MA max(Negative)} = (50 * -4) + 10 * \left(-\frac{4*8}{2} - \frac{2*2}{2}\right)$$

$$= -700\ kN.m$$

H.W1: for the same example 3 draw the I.L for (RA, RE and MC) then find max positive and mx Negative bending moment at (C) due to a moving concentrated load 60 kN, a uniform live load 5 kN/m.