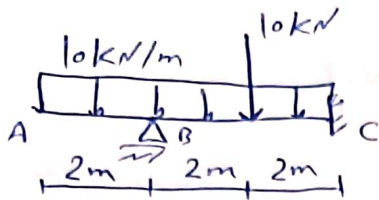


دير الزور

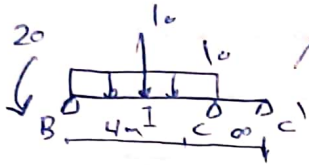
علم تصحيح إشارات 11
قسم الماشية
2024-2025
ف 2



السؤال الأول: [35] درجة

طلب أول: 25 درجة

* نفرض عند الوتاقة في C بـجاء طولها $L \rightarrow 0$ وصلايتها ∞



$$M_{BA} = -\frac{10 \cdot 2^2}{2} = -20 \text{ kN}\cdot\text{m}$$

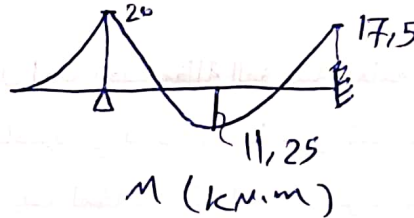
* قانون المزدحم الثلاثة (2)

$$\frac{M_A \cdot L_1}{I_1} + 2M_B \left(\frac{L_1}{I_1} + \frac{L_2}{I_2} \right) + M_C \frac{L_2}{I_2} = -\frac{wL_1^3}{4I_1} - \frac{PL_1}{I_2} (k_2 - k_1^3)$$

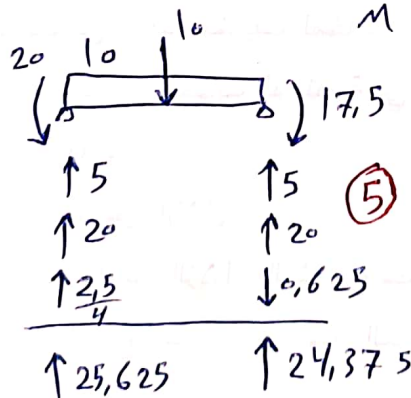
* نطبق المعادلة على المجال Bcc (12)

$$\frac{M_B \cdot 4}{I} + 2M_C \left(\frac{4}{I} + \frac{0}{\infty} \right) + M_C \frac{0}{\infty} = -\frac{10 \cdot 4^3}{4I} - \frac{10 \cdot 4}{I} \left(\frac{1}{2} - \left(\frac{1}{2} \right)^3 \right)$$

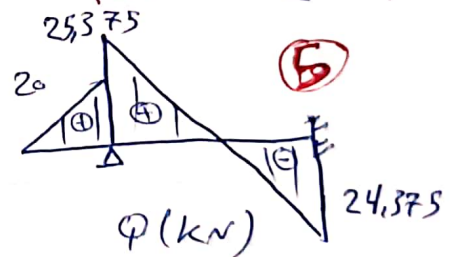
$$\frac{-20 \cdot 4}{I} + \frac{8M_C}{I} = \frac{-160}{I} - \frac{160}{I} (0,375) \rightarrow M_C = -17,5 \text{ kN}\cdot\text{m}$$



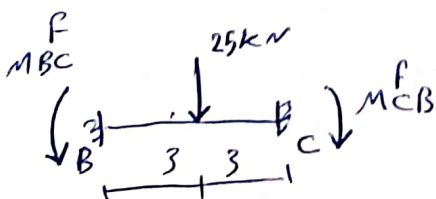
(5)



طلب ثاني: 10 درجة

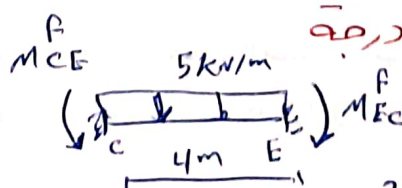


(6)



$$M_{BC}^F = \frac{-25 \cdot 6}{8} = -18,75 \text{ kN}\cdot\text{m}$$

$$M_{CB}^F = +18,75$$



$$M_{CE}^F = \frac{-5 \cdot 4^2}{12} = -6,67 \text{ kN}\cdot\text{m}$$

$$M_{EC}^F = +6,67 \text{ kN}\cdot\text{m}$$

السؤال الثاني: [35] درجة

طلب أول: 24 درجة

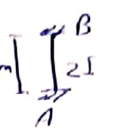
حاجب المزدحم الوثوق (4)

كتاب السؤال الثاني :
كتاب مصادر الطاقة الموزعة :

$$M_{AB} = \frac{2EI}{L} (2\theta_A + \theta_B) + M_{AB}^F$$

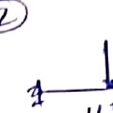
$$M_{BA} = \frac{2EI}{L} (\theta_A + 2\theta_B) + M_{BA}^F$$

$$M_{CD} = \frac{3EI}{L} (\theta_C - \psi) + M_{CD}^F$$

العنصر AB : (2) 

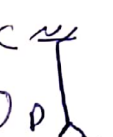
$$M_{AB} = \frac{2 \cdot 2EI}{5} (0 + \theta_B) + 0 \Rightarrow M_{AB} = 0,8EI\theta_B \quad (1)$$

$$M_{BA} = \frac{2 \cdot 2EI}{5} (0 + 2\theta_B) + 0 \Rightarrow M_{BA} = 1,6EI\theta_B \quad (2)$$

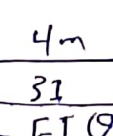
العنصر BC : (2) 

$$M_{BC} = \frac{2 \cdot 4EI}{6} (2\theta_B + \theta_C) - 18,75 \Rightarrow M_{BC} = \frac{4}{3}EI(2\theta_B + \theta_C) - 18,75 \quad (3)$$

$$M_{CB} = \frac{4}{3}EI(\theta_B + 2\theta_C) + 18,75 \quad (4)$$

العنصر DC : (1) 

$$M_{CD} = \frac{3EI}{5} \theta_C + 0 \Rightarrow M_{CD} = 0,6EI\theta_C \quad (5)$$

العنصر CE : (2) 

$$M_{CE} = \frac{2 \cdot 3EI}{4} (2\theta_C + \theta_E) + M_{CE}^F \Rightarrow M_{CE} = \frac{3}{2}EI\theta_C - 6,67 \quad (6)$$

$$M_{EC} = 1,5EI\theta_C + 6,67 \quad (7)$$

توازن العقدة B : (2) $-M_{BA} - M_{BC} = 0$

$$1,6EI\theta_B = -\frac{8}{3}EI\theta_B - \frac{4}{3}EI\theta_C + 18,75 \Rightarrow$$

$$4,267\theta_B + \frac{4}{3}\theta_C - \frac{18,75}{EI} = 0 \quad (I)$$

توازن العقدة C : (2) $-M_{CB} - M_{CD} - M_{CE} = 0 \Rightarrow$

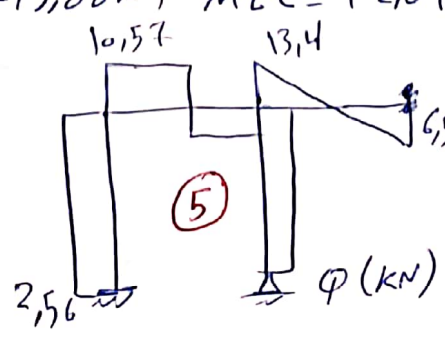
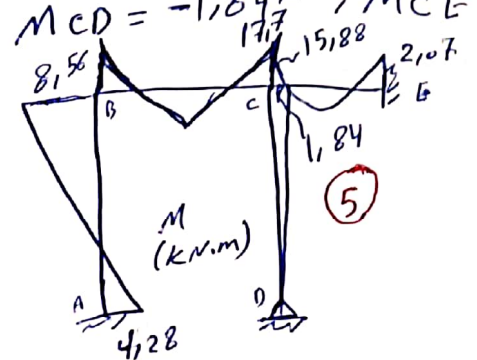
$$\frac{4}{3}\theta_B + \frac{8}{3}\theta_C + \frac{18,75}{EI} + 0,6\theta_C + 3\theta_C - \frac{6,67}{EI} = 0$$

$$1,333\theta_B + 6,267\theta_C + \frac{12,08}{EI} = 0 \quad (II)$$

حل II و I نجد : (2)

$$\theta_B = \frac{5,35}{EI}, \theta_C = \frac{-3,07}{EI}$$

(2) $M_{AB} = 4,28 \text{ kN.m}, M_{BA} = +8,56, M_{BC} = -8,58, M_{CB} = 17,17, M_{CD} = -1,84$
 $M_{CD} = -1,84 \text{ kN.m}, M_{CE} = -15,88 \text{ kN.m}, M_{EC} = +2,07 \text{ kN.m}$



طلب مايلي : (2)
 (4) تفصيل حاج قوى القص :
 رسم مخطط القص :