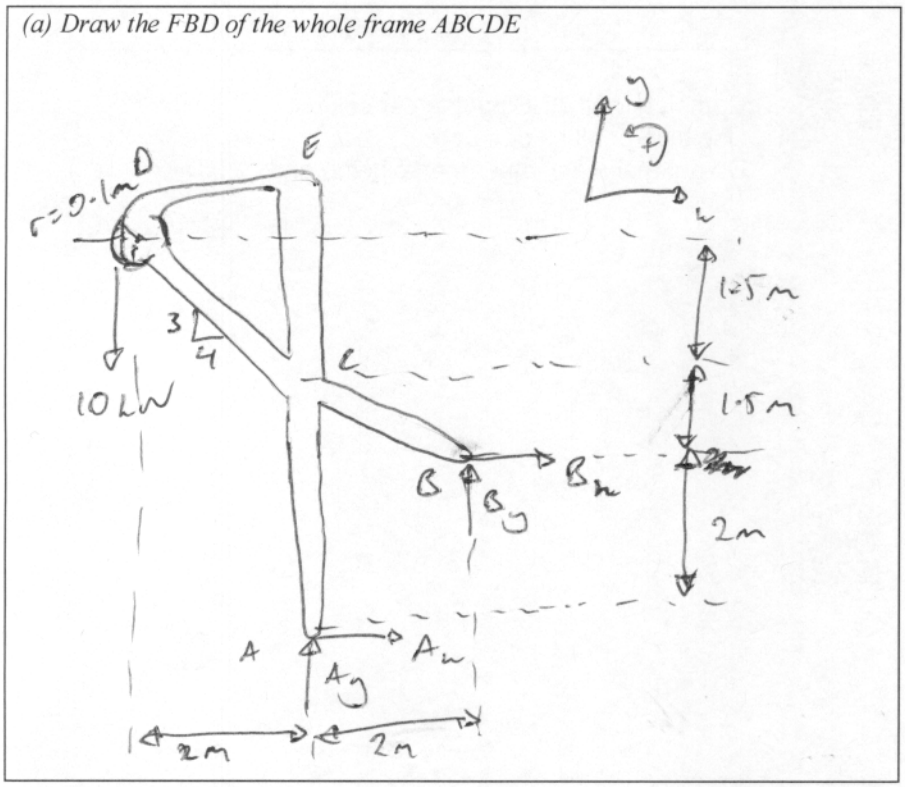
Question 1: (2 Marks)

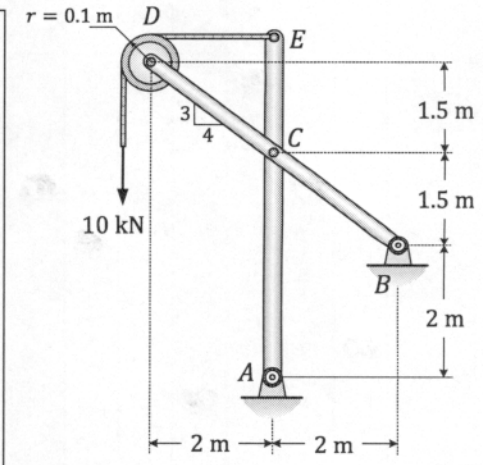
For the loaded frame shown, determine the following:

(Proceed according to the steps provided in solution boxes)

Solution:

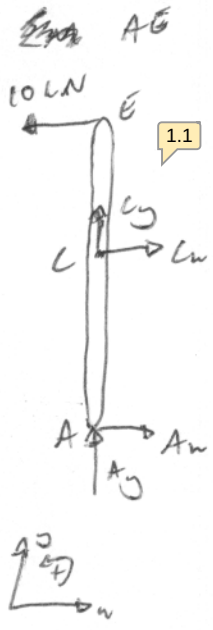
(a) Draw the FBD of the whole frame ABCDE





(b) Determine the pin reactions at B (B_x and B_y) and C (C_x and C_y) on member BCD

– Include the free body diagram of your chosen system(s)



$\Sigma M_A = 0$

$10\left(\frac{3}{5}\right) - C_x(3.5) = 0$

$\therefore C_x = \frac{100}{7} \approx 14.3 \text{ kN} \rightarrow$

$\Sigma F_x = 0$

$-10 + C_x + A_x = 0$

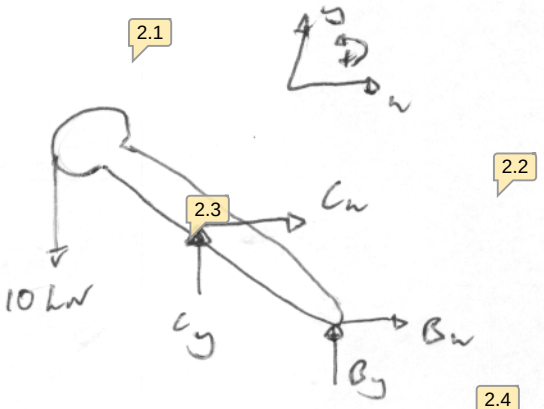
$-10 + \frac{100}{7} + A_x = 0$

$\therefore A_x = -\frac{30}{7} \text{ kN} \rightarrow$

$\approx 4.29 \text{ kN} \leftarrow$

RJBV2OEM 1

Continue your solution to part (b) here:



$\Sigma M_B = 0$

$10(4) - C_y(2) - C_x(1.5) = 0$

$40 - 2C_y - \frac{100}{7}(1.5) = 0$

$\therefore C_y = \frac{65}{7} \approx 9.29 \text{ kN} \uparrow$

$\Sigma F_y = 0$

$-10 + C_y + B_y = 0$

$-10 + \frac{65}{7} + B_y = 0$

$\therefore B_y = \frac{5}{7} \approx 0.71 \text{ kN} \uparrow$

$\Sigma F_x = 0$

$B_x + C_x = 0$

$B_x = -14.3 \text{ kN} \rightarrow$

Answers:	$B_x = 14.3$ kN ←	$B_y = 0.71$ kN ↑	$C_x = 14.3$ kN →	$C_y = 9.29$ kN ↑	RJBV2OEM 2

Index of comments