Clave

PrepaTec Departamento de ciencias PrepaTec Toluca Tecnológico de Monterrey	Energy & Transformation PC 6046 Grupo:	Professor: Alejandro Portales
	Partial Exam	February 14, 2022
	Name:	
	ID:	
	C	
	Points	

1) Find the angles and magnitude of the following vector

A= (15, -19, 28) $\|A\| = 37.01$

$\theta_x = 66.09°$

$\theta_y = 120.88°$

$\theta_z = 40.83°$

2) Find the cross and dote product of the following two vectors.

$A \times B = \begin{vmatrix} i & j & k \\ 9 & 13 & -9 \\ -10 & 7 & 8 \end{vmatrix} \begin{matrix} i & j \\ 9 & 13 \\ -10 & 7 \end{matrix}$

A= (9, 13, -9) B= (-10, 7, 8)

$A \cdot B = -71$

$i = 167i$

$j = 18j$

$k = 193k$

$A \times B = 167i\ 18j\ 193k$

3) Find the angle between the two given vectors

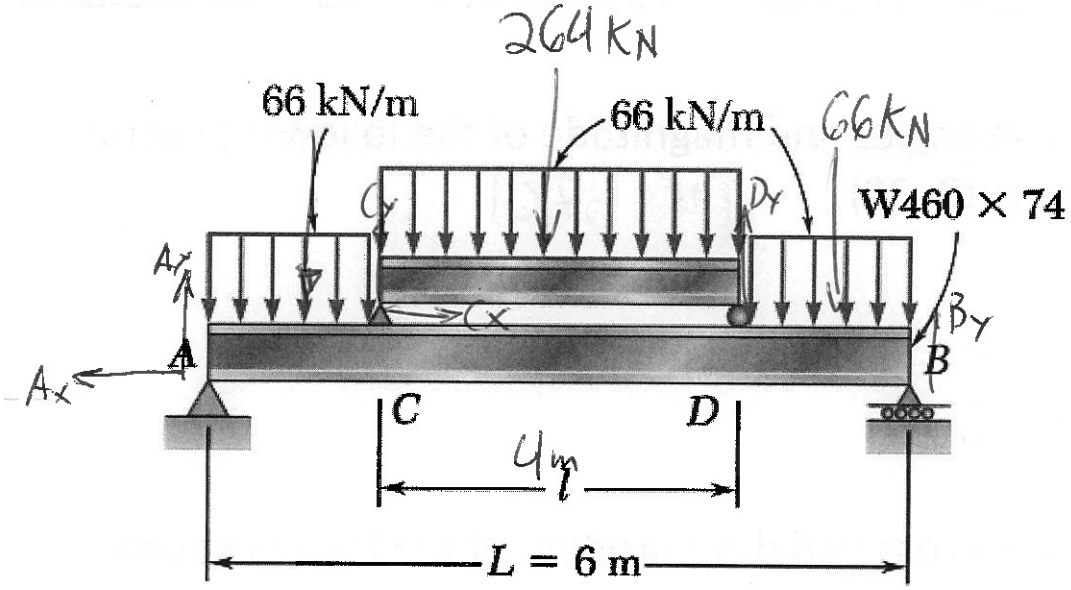
A= (17, 3, -8) B= (9, -15, 6)

$A \cdot B = 60$

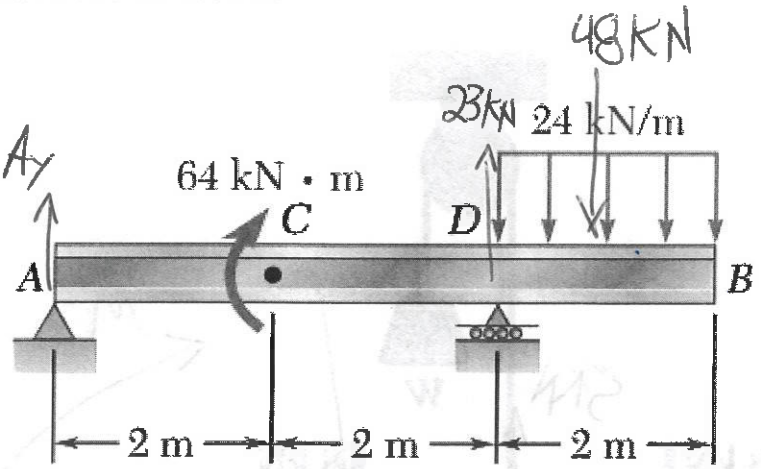
$A \theta B = \cos^{-1}\left(\frac{A \cdot B}{\|A\| \cdot \|B\|}\right)$ $\frac{60}{} = 80.18°$

$\sphericalangle AB = 99.81°$

4) Draw the complete FBD for the following exercise, showing the resultant forces made by the distributed force, and the reaction force of the two supports (just the vector). L= 4m



5) If the addition of moments in C = 64kN*m, and the reaction force in D = 23kN. How much and with what direction is the resultant force in A?



$\sum M_C = -64\,kN\cdot m$

$-A_y(2) + 23(2) - 48(3) = -64$

~~$-(98)+A_y(2)$~~

$A_y =$

$-A_y(2) = 64 + 98$

$A_y(2) = -162$

$A_y = -81\,kN$

$-A_y(2) - 98 = -64$

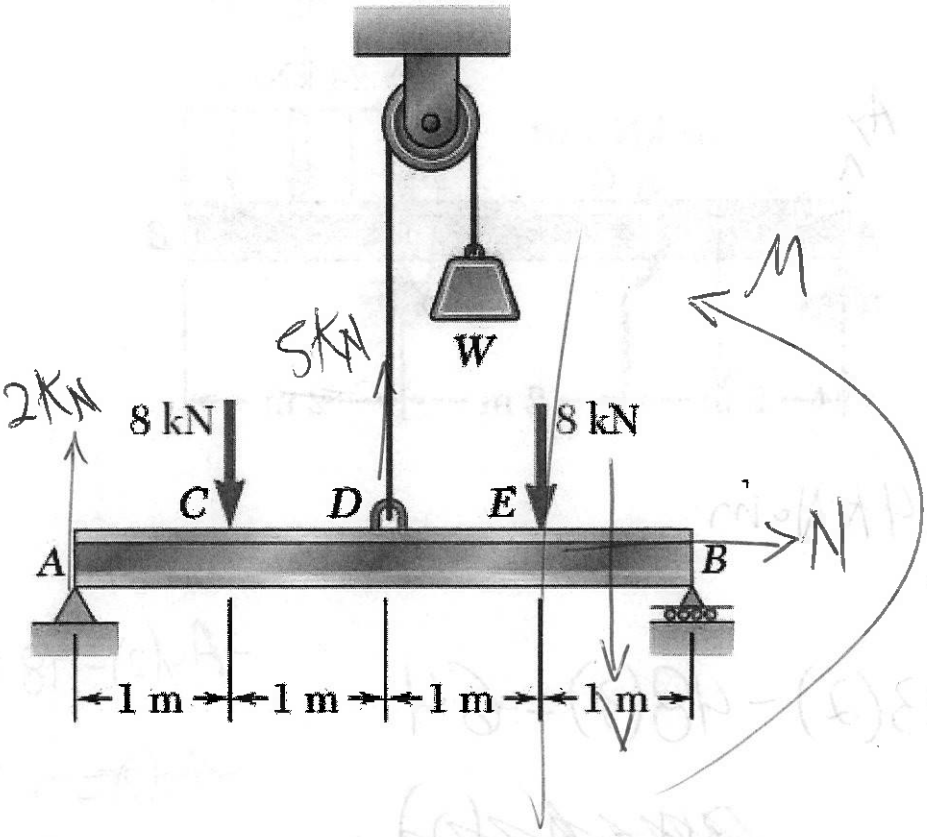
$-A_y(2) = -64 + 98$

$+A_y(2) = -34$

$A_y = -17$

$A_y = 81\,kN \downarrow$

6) Assume the reaction in A is equal to 2kN and W=5KN, calculate normal, shear and momentum in E of the following figure.



$\Sigma F_x = 0$

$N = 0$

$\Sigma F_y = 0$

$2 - 8 + 5 - 8 - V = 0$

$V = -9\,kN$

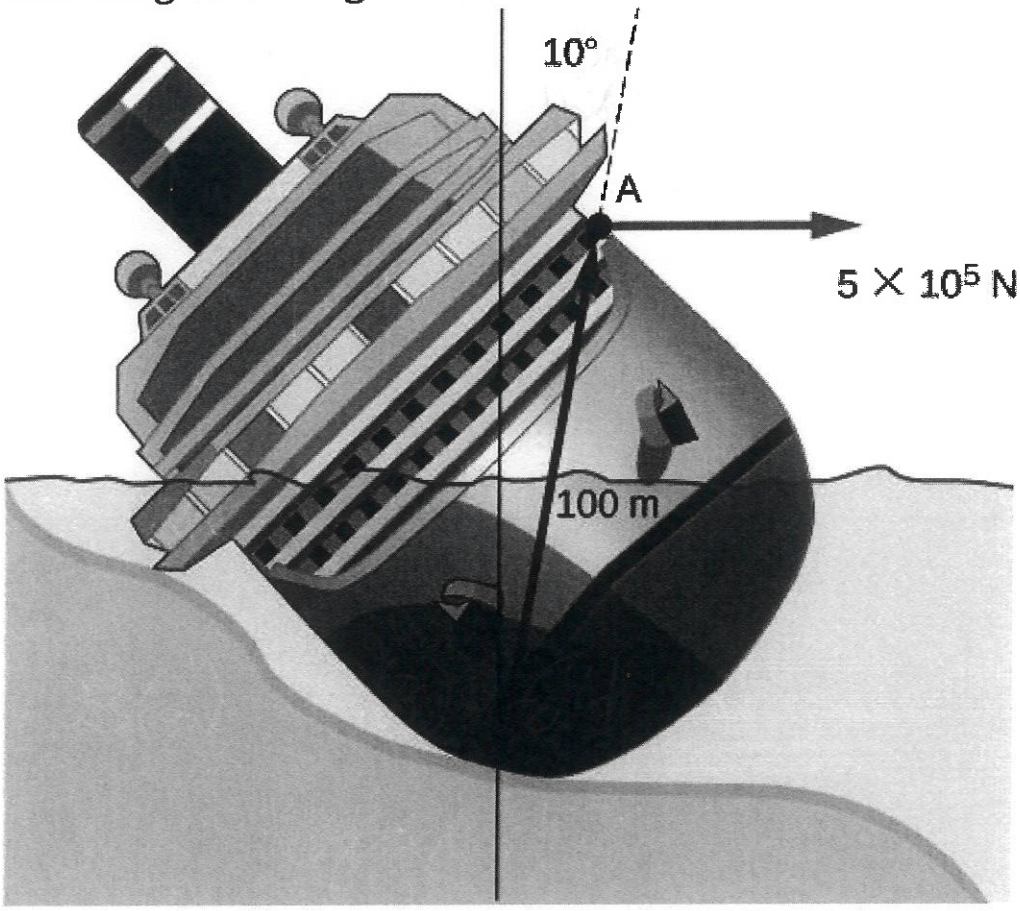
$\Sigma M_E = 0$

$-2(3) + 8(2) - 5(1) - M = 0$

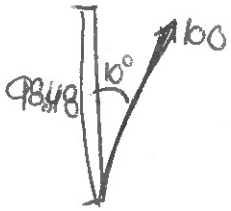
$M = 5\,N \cdot m$

EXTRA (5pts)

7) Calculate the total torque generated to set the ship free acording to the figure bellow



$100\cos(10°) = 98.48\,m$



$5\times10^{5}(98.48)$

$49.24\times10^{6}\,N\cdot m$