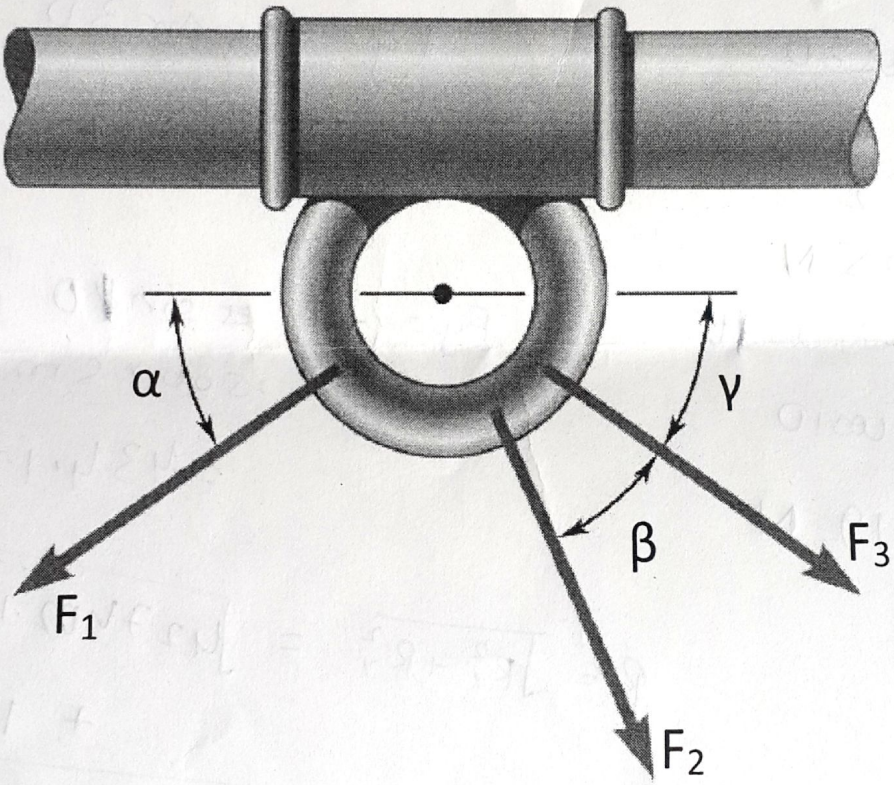
GNG 1105D DGD 3

Quiz 1

Instructions: 20 minutes. Closed book. Non-programmable calculators allowed.

Question:

Three forces act on the ring as shown. Determine the resultant force($\vec{R}$).



Where: α=10°

β=20°

γ=30°

F1=2500N

F2=3500N

F3=1000N

tan 30 = 1/√3 = 1·√3/3

tan β =

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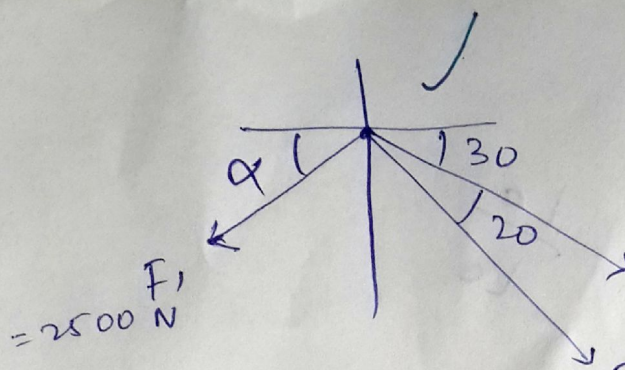

$F_2 \Rightarrow \quad F_x = +F_2 \cos 50 \;,\; F_y = -F_2 \sin 50$

$= 3500 \times \cos 50 \qquad = -3500 \times \sin 50$

$= 2249.756\ N \qquad = -2681.155\ N$

$F_3 \Rightarrow \quad F_x = F_3 \cos 30 \qquad F_y = -F_3 \sin 30$

$= 1000 \times \frac{\sqrt{3}}{2} \qquad = -1000 \times \frac{1}{2} = -500\ N$

$= 866.025\ N$

$F_1 \Rightarrow \quad F_x = -F_1 \cos \alpha 0 \qquad F_y = -F_1 \sin \alpha 0$

$= -2500 \times \cos 10 \qquad = -2500 \times \sin 10$

$= -2462.019\ N \qquad = -434.120\ N$

R_x	R_y
F_{1x}	F_{1y}
F_{2x}	F_{2y}
F_{3x}	F_{3y}
+	
2249.756 N	−2681.155 N
866.025 N	−500 N
−2462.019 N	−434.120 N
653.76 N	−3615.27 N

$R = \sqrt{R_x^2 + R_y^2} = \sqrt{427402.137 + 13070177.17}$

$R = 3673.9\ N$

$\tan\beta = \frac{R_y}{R_x} = \frac{-3615.27}{653.76}$

$= -5.529$

$\beta = \tan^{-1}(-5.529)$ = ?!!

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