ARCH 614: Example Note Page for Quiz Use

ENDS 231: Practice Quiz 2

Note: No aids are allowed for part 1. The text (reference charts) and one side of a letter sized paper with notes are allowed during part 2, along with a silent, non-programmable calculator.

Clearly show your work and answer.

**Part 1**  
Worth 5 points  (conceptual questions)

**Part 2**  
Worth 45 points

The structure shown is supporting a cable system with a force due to a mass. *(NOTE: The support configuration for the non-cables in the system and the slopes of the cables can be changed for the quiz!)*

Using clear free body diagrams, determine:

a) the forces in cables CD and DE.

b) the support reactions (with direction).

\[ \begin{align*}
\text{Equilibrium at point} & : \text{Free the point with cables & weight or struts or truss members Draw forces away if unknown. Get angle or geometry of forces. } E_F & = 0 \\
& E_F & = 0. \text{ Algebra divide both sides by same # to cancel move to other side by changing sign.} \\
& \text{DE} & = 90 - 65 \\
& \text{500 N} & \text{E}_{F_x} = \text{CD} \cdot \cos 155 + \text{DE} \cdot \cos 25 = 0 \quad \text{DE} = \text{CD} \cdot 591.6 \quad \text{E}_{F_y} = \text{CD} \cdot \sin 155 + (\text{CD}) \cdot \sin 25 - 500 = 0 \quad \text{0.845 CD} = 500 \quad \text{N} \end{align*} \]

\[ \begin{align*}
& 3^2 + 7^2 = 7.62 \quad 5.66 \\
& \text{MA} = \text{MA} - 210 \cdot 3.6 \cdot 591.6 \cdot \sin 25 - 5.10 \\
& \text{MA} = 3200.0 \quad \text{N} \cdot \text{m} \\
& \text{A}_{F_x} = \pm 210.3 + \mp 591.6 \cdot \sin 25 \quad \text{5.10} \\
& \text{A}_{F_y} = \pm 618.8 \quad \text{7.62} \\
& \text{EM} = \text{MA} - 210 \cdot 3.6 \cdot 591.6 \cdot \sin 25 - 5.10 \\
& \text{MA} = 3200.0 \quad \text{N} \cdot \text{m} \\
& \text{Similar triangles} \quad \frac{a}{b} = \frac{c}{b} \\
& a = 442.9 \quad \text{N} \cdot \text{m} \text{ distances to forces. IF NOT}
\end{align*} \]

Answers  Not provided on actual quiz!

\[ \begin{align*}
& \text{a) CD} = 591.6 \quad \text{N}, \text{ DE} = 591.6 \quad \text{N} \\
& \text{b) A}_x = -618.9 \quad \text{N}, \text{ A}_y = 443.0 \quad \text{N}, \text{ MA} = +3203.4 \quad \text{N} \cdot \text{m} \\
& \text{Disclaimer: Answers have NOT been painstakingly researched.}
\end{align*} \]