

NAME:

Quiz 06: Chapter 06

Determine the force in each member of the truss shown. State whether the member is in tension (*T*) or compression (*C*). (*Hint*: You actually don't need to solve for reactions at *A* and *B*; start with joint *C*. *C* gets you *D*, then *C* and *D* get you *B*, and done.)

Joint *C*:

$$\sum F_x = F_{BC} \cos 45^\circ - F_{CD} = 0$$

$$\sum F_y = F_{BC} \sin 45^\circ - 5000 \text{ N} = 0$$

$$F_{BC} = \frac{5000 \text{ N}}{\sin 45^\circ} = 7071 \text{ N (C)}$$

$$F_{CD} = F_{BC} \cos 45^\circ = 5000 \text{ N (T)}$$

Joint *D*:

$$\sum F_x = F_{CD} - F_{BD} \cos 55^\circ - F_{AD} \cos 45^\circ = 0$$

$$\sum F_y = F_{BD} \sin 55^\circ - F_{AD} \sin 45^\circ = 0$$

$$F_{BD} = \frac{\sin 45^\circ}{\sin 55^\circ} F_{AD} = 0.863 F_{AD}$$

$$(0.863 F_{AD}) \cos 55^\circ + F_{AD} \cos 45^\circ = 5000 \text{ N}$$

$$F_{AD} = 4159 \text{ N (T)}$$

$$F_{BD} = 3590 \text{ N (C)}$$

Joint *B*:

$$\sum F_x = F_{AB} + F_{BD} \cos 55^\circ - F_{BC} \cos 45^\circ = 0$$

$$F_{AB} = (7071 \text{ N}) \cos 45^\circ - (3590 \text{ N}) \cos 55^\circ$$

$$F_{AB} = 2941 \text{ N (C)}$$

