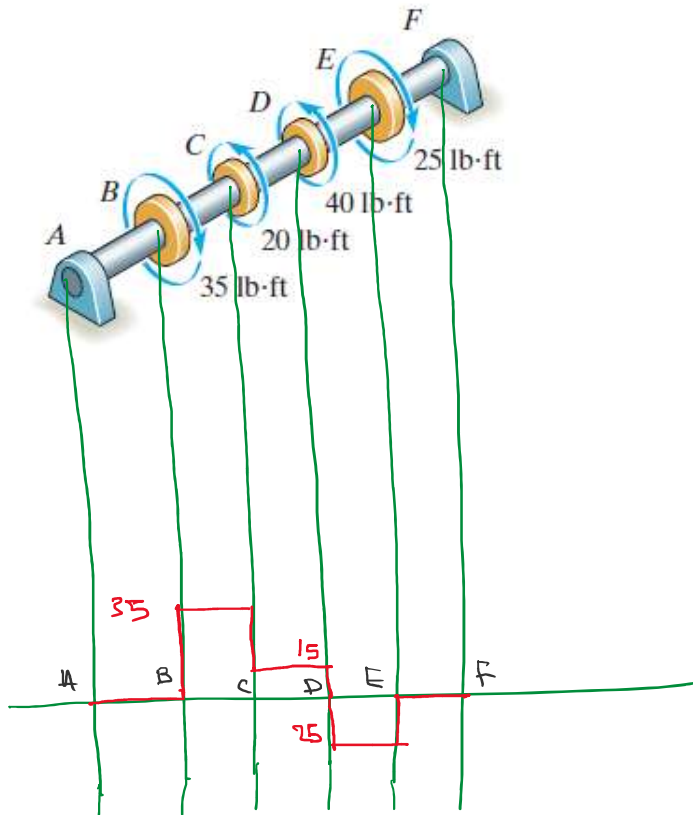


5-7. The solid shaft has a diameter of 0.75 in. If it is subjected to the torques shown, determine the maximum shear stress developed in regions *CD* and *EF* of the shaft. The bearings at *A* and *F* allow free rotation of the shaft.



From above diagram,  $T_{EF} = 0$  ;  $T_{CD} = 15$

$$\frac{\tau_{EF, \max}}{R} = \frac{T_{EF}}{J} \quad [\text{Torque equation}]$$

$$\Rightarrow \tau_{EF} = 0$$

$$\tau_{CD, Max} = \frac{15 \times 12 \times 0.375}{\frac{\pi}{2} (0.375)^4} = 2173 \text{ psi}$$
$$= 2.17 \text{ ksi}$$

$$\Rightarrow \tau_{CD, Max} = 2.17 \text{ ksi}$$

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