A. Consider the reinforced concrete T-beam shown below. Assume that #3 bars are used for all stirrups.

a. Determine if the cross-section satisfy the ACI 318 provisions for spacing, cover, and amount of reinforcement.

b. Calculate the design flexural capacity, $\phi M_n$, if the cross-section satisfies part a.

\[ f_c' = 4,000 \text{ psi} \]
\[ f_y = 40 \text{ ksi} \]

B. Consider the reinforced concrete T-beam shown below. Assume that #3 bars are used for all stirrups.

a. Determine if the cross-section satisfy the ACI 318 provisions for spacing, cover, and amount of reinforcement.

b. Calculate the design flexural capacity, $\phi M_n$, if the cross-section satisfies part a.

\[ f_c' = 3,000 \text{ psi} \]
\[ f_y = 60 \text{ ksi} \]
Prob 3.13 of Nilson’s Book.
A concrete floor system consists of parallel T beams spaced 10 ft on centers and spanning 32 ft between supports. The 6 in. thick slab is cast monolithically with T beam webs having width $b_w = 14$ in. and total depth, measured from the top of the slab, of $h = 28$ in. The effective depth will be taken 3 in. less than the total depth. In addition to its own weight, each T beam must carry a superimposed dead load of 50 psf and service live load of 225 psf. Material strength are

$$f'_c = 3,000 \text{ psi}$$
$$f_y = 60 \text{ ksi}$$

Determine the required tensile steel area and select the reinforcedment needed for a typical member.