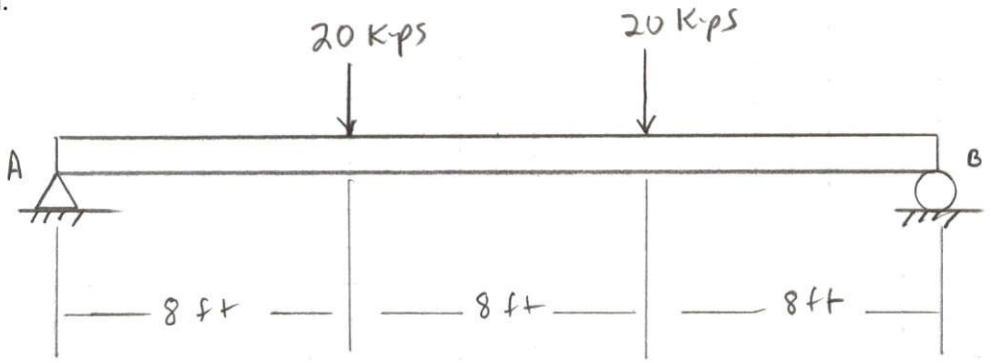
14-5

A simple beam has a 24-ft span and a W16 x 50 section. Determine the maximum flexural stress due to two concentrated loads of 20 kips each applied at the third points along the beam.

Solution.



From Table 13-1, case 3

$$M_{MAX} = Pa = 20\ \text{K-ps}\ (8\ \text{ft}) = 160\ \text{K-p-ft}$$

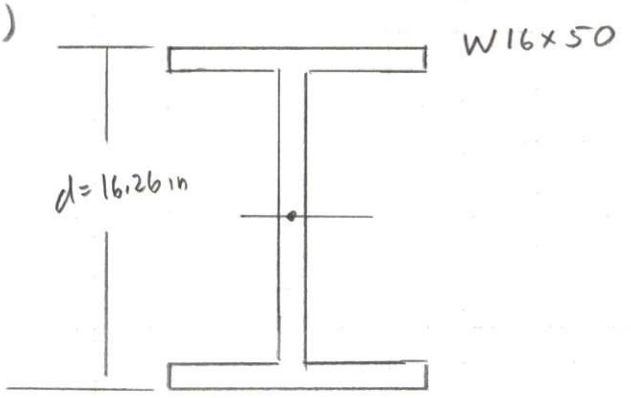
From Table A-1(a)

W16x50

$S = 81.0\ \text{in.}^3$

$I = 659\ \text{in.}^4$

$d = 16.26\ \text{in.}$



$$\sigma_{MAX} = \frac{M_{MAX}}{S} = \frac{160\ \text{K-p-ft}\ \left(\frac{12\text{in}}{\text{ft}}\right)}{81\ \text{in.}^3} = 23.7\ \text{KSI}$$