34. Applying Eq. 3-23, $\vec{F} = q\vec{v} \times \vec{B}$ (where q is a scalar) becomes

$$F_x\,\hat{\mathrm{i}} + F_y\,\hat{\mathrm{j}} + F_z\,\hat{\mathrm{k}} = q\,(v_yB_z - v_zB_y)\,\hat{\mathrm{i}} + q\,(v_zB_x - v_xB_z)\,\hat{\mathrm{j}} + q\,(v_xB_y - v_yB_x)\,\hat{\mathrm{k}}$$

which – plugging in values – leads to three equalities:

$$\begin{aligned} 4.0 &= 2\,(4.0B_z - 6.0B_y) \\ -20 &= 2\,(6.0B_x - 2.0B_z) \\ 12 &= 2\,(2.0B_y - 4.0B_x) \end{aligned}$$

Since we are told that $B_x = B_y$, the third equation leads to $B_y = -3.0$. Inserting this value into the first equation, we find $B_z = -4.0$. Thus, our answer is

$$\vec{B} = -3.0\,\hat{\mathrm{i}} - 3.0\,\hat{\mathrm{j}} - 4.0\,\hat{\mathrm{k}}\ .$$