5 33 (a)
$$\vec{F}_{12} = -\frac{\mu_0}{4\pi} I_1 I_2 \oint \frac{(d\vec{i}_1 \cdot d\vec{i}_2) \vec{n}_1}{|\vec{v}_{11}|^3}$$

(a)
$$\vec{F}_{12} = -\frac{d_0}{4\pi} \vec{\Gamma}_1 \vec{\Gamma}_2 + \frac{d_1}{4\pi} \vec{\Gamma}_{12} \vec{\Gamma}_{12}$$

Since
$$\vec{x}_{11} = \vec{y}_1 - \vec{y}_1 + \vec{r}_1$$
, and

(a)
$$\vec{F}_{12} = -\frac{do}{4\pi} \vec{I}_1 \vec{I}_2 \oint \frac{(d\vec{I}_1 \cdot d\vec{I}_2)^2 \vec{I}_1}{|\vec{V}_{12}|^2}$$

a)
$$F_{12} = -\frac{2}{4\pi} I_1 I_2 g g \frac{(a)^2}{|\nabla_{12}|^2}$$

$$F_{12} = -\frac{\mu_0}{4\pi} I_1 I_2 \oint \frac{(dl_1 \cdot dl_2) \pi n}{|\vec{v}_{11}|^2}$$

$$F_{12} = -\frac{\mu_0}{4\pi} I_1 I_2 \oint \int \frac{(dl_1 \cdot dl_2) n_1}{|\vec{v}_{11}|^3}$$

$$\vec{F}_{12} = -\frac{\mu_0}{4\pi} I_1 I_2 \oint \int \frac{(dl_1 \cdot dl_2)^{3} n}{|\vec{v}_{11}|^2}$$

$$\vec{F}_{12} = -\frac{\mu_0}{4\pi} I_1 I_2 \oint \frac{(dl_1 \cdot dl_2) \eta_n}{|\vec{v}_{11}|^2}$$

$$\vec{F}_{12} = -\frac{\mu_0}{4\pi} I_1 I_2 \oint \frac{(d\vec{r}_1 \cdot d\vec{r}_2) \eta_1}{|\vec{v}_{12}|^3}$$

We have $\vec{F}_{ir} = \vec{I}_i \vec{I}_r \nabla_R \left(\frac{N_0}{4\pi} \oint \int \frac{d\vec{l} \cdot d\vec{l}_r}{|\vec{x} - \vec{x} + \vec{k}|} \right) = \vec{I}_r \vec{I}_r \nabla_R M_{12}(\vec{k})$

 $\nabla_{R}\left(\frac{1}{|\vec{x}_{1}-\vec{x}_{1}+\vec{x}_{1}|}\right)=-\frac{\vec{x}_{1}-\vec{x}_{2}+R}{|\vec{x}_{1}-\vec{x}_{2}+\vec{x}_{1}|^{3}}=-\frac{\vec{x}_{1\nu}}{|\vec{x}_{1}|^{3}}$

 $\nabla_{R}^{2}\left(\frac{1}{|\vec{x}_{1}-\vec{x}_{1}+\vec{k}|}\right)=-4\pi F(\vec{x}-\vec{x}_{1}+\vec{k})$

Since $\vec{p} \neq \vec{x}_2 - \vec{x}_1$, unless two loops touch. Therefore

 $\nabla_{e}^{2}\left(\frac{1}{|\vec{x}_{i}-\vec{x}_{i}+\vec{n}|}\right)=0$, and $\nabla_{e}^{2}M(\vec{n})=0$

$$\frac{\vec{k}_{\nu})\vec{n}_{n}}{\sqrt{1^{3}}}$$

$$(\frac{1}{2})^{\frac{1}{2}}$$