

Answers – Week 8

8-1 (1) Positive (2) Zero (3) Negative

8-3 $\underline{B} = +1.508 T \hat{z}$

8-5 $\underline{B} = +10^{-3} T \hat{z}$

8-7 $\underline{\tau} = -0.39 N - m \hat{z}$

8-9 To use Ampere's law, we need a circle centered on the wire as a loop. \underline{B} everywhere will be tangent to the circle, therefore

$$\sum_C \underline{B} \cdot \underline{\Delta \ell} = (B(r) \times 2\pi r) = \mu_0 I \text{ and hence } \underline{B}(r) = \frac{\mu_0 I}{2\pi r} \hat{\phi}.$$

8-11 $R = \frac{MV}{qB}$, Larger charge lands at P_1 .

8-13 Establish a current in the coil. Coil will begin to rotate. Reverse the current every time the normal to the coil is parallel/ anti-parallel to \underline{B} .

8-15 For a closed surface $\sum_C \underline{B} \cdot \underline{\Delta A} \equiv 0$, therefore flux of \underline{B} through the other three surfaces must be $-90 \mu T - m^2$.