

# Physics 2326 - Dr. Terry Honan

## ■ Test 3 - A - Answers

**Problem 1** (i) E (ii) E (iii) C (iv) C (v) B

**Problem 2** (a) .0362 T (b) 0.0972 Nm

**Problem 3** For  $r < a$ ,  $B = \frac{\mu_0 I r}{2\pi a^2}$ . For  $a < r < b$ ,  $B = \frac{\mu_0 I}{2\pi r}$ . For  $r > b$ ,  $B = 0$ .

**Problem 4**  $6.84 \times 10^{-17}$  N (away from wire)

**Problem 5**  $\frac{\mu_0 I}{4a} - \frac{\mu_0 I}{2\pi \sqrt{b^2+c^2}} \left( \frac{b}{c} + \frac{c}{b} \right)$  (into page)

**Problem 6**  $\mathcal{E} = 0.0335$  V

**Problem 7** (a)  $\mu_0 n \alpha \ell^2 N$  (b) counterclockwise

## ■ Test 3 - B - Answers

**Problem 1** (i) F (ii) F (iii) D (iv) A (v) C (vi) C

**Problem 2** For  $r < a$ ,  $B = 0$ . For  $a < r < b$ ,  $B = \frac{\mu_0 I}{2\pi r} \frac{r^2 - a^2}{b^2 - a^2}$ . For  $r > b$ ,  $B = \frac{\mu_0 I}{2\pi r}$

**Problem 3** (a)  $3.14 \times 10^{-3}$  T (b)  $0.0283$  N·m

**Problem 4** 2.64 V (counterclockwise)

**Problem 5** (a)  $\frac{\mu_0 I_1}{\pi \sqrt{a^2+b^2}} \left( \frac{b}{a} + \frac{a}{b} \right) - \frac{\mu_0 I_2}{2\pi c}$  (into page)

(b)  $\frac{\mu_0 I_1 I_2 b}{\pi} \left( \frac{1}{c-a} - \frac{1}{c+a} \right)$  (to the left)