

Physics 2426 - Dr. Terry Honan

■ Test 2 - A - Answers

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

Problem 2 (a) $I_5 = I_3 + I_4$, $I_2 + I_4 = I_1$, $0 = -7I_3 + 6 - 5I_5 + 5 - 3I_5$, $0 = 2 - 2I_4 + 9I_2 - 7 - 6 + 7I_3$, $0 = 7 - 9I_2 - 4I_1 + 8$, (b) 6.63Ω

Problem 3 (a) 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 $r > b$, $B = 0$. (b) $\frac{U}{\ell} = \frac{\pi \epsilon_0 \kappa}{\ln(b/a)} V^2$

Problem 4 (a) $1.059 \times 10^7 \frac{A}{m^2}$ (b) $9.74^\circ C$

Problem 5 (a) $.0362 T$ (b) $0.0972 N \cdot m$

Problem 6 (a)

	10 Ω	12 Ω	15 Ω
V	30 V	60 V	30 V
I	3 A	5 A	2 A

 (b) $t = 2.996 \tau$ (c) $6.84 \times 10^{-17} N$ (away for wire)

Problem 7 (a) $\langle 12.8, 0, -19.2 \rangle N$ (b) $\frac{\mu_0 I}{4a} - \frac{\mu_0 I}{2\pi \sqrt{b^2+c^2}} \left(\frac{b}{c} + \frac{c}{b} \right)$ (into page)

■ Test 2 - B - Answers

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

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) $0.01443 V/m$ (b) $5.37 A$

Problem 4 (a) $3.14 \times 10^{-3} T$ (b) $0.0283 N \cdot m$

Problem 5 (a) $-8 V$ (b) 7.62Ω (c) $15.7 \mu F$

Problem 6 (a)

	100 Ω	120 Ω	150 Ω
V	4 V	8 V	4 V
I	.0400 A	.0667 A	.0267 A

 (b) $\langle 7.69, 5.13, 0 \rangle \times 10^{-21} N$

Problem 7 (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)