

SIGNATURE \_\_\_\_\_ NAME \_\_\_\_\_

Student ID # \_\_\_\_\_

Physics 404  
Spring 2010  
Prof. Anlage  
First Mid-Term Exam  
4 March, 2010

**CLOSED BOOK, NO Calculator Permitted, CLOSED NOTES**

**Point totals are given for each part of the question.**

If you run out of room, continue writing on the back of the same page. If you do so, make a note on the front part of the page!

Note: You must solve the problem following the instructions given in the problem. Correct answers alone will not receive full credit.

*If you have trouble with one question, go on to the others; most of the problems have easy parts.*

**Partial Credit:**

→ Show Your Work! Answers written with no explanation will not receive full credit.

→ You can receive credit for describing the method you would use to solve a problem, even if you missed an earlier part.

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Problem	Credit	Max. Credit
1		25
2		25
3		25
4		25
TOTAL		100

$$\int_{-\infty}^{+\infty} \exp(-x^2) dx = \pi^{1/2} \quad \int_{-\infty}^{+\infty} x^2 \exp(-x^2) dx = \frac{\pi^{1/2}}{2} \quad n! \cong (2\pi n)^{1/2} n^n \exp\left[-n + \frac{1}{12n}\right] \quad \frac{1}{1-x} = \sum_{n=0}^{\infty} x^n$$

$$dU(\sigma, V) = \tau d\sigma - PdV$$

$$Z = \sum_s \exp(-\varepsilon_s/\tau)$$

$$dF(\tau, V) = -\sigma d\tau - PdV$$

$$F = -\tau \log(Z)$$