

Name:

Student ID Number:

## Physics 8: Midterm Exam

May 4, 2006

Version A

- Be sure to write your name at the top of each page
- Multiple Choice problems are worth 2.5 points each for a total of 50 points
- True/False problems are worth 2.5 points each for a total of 25 points
- Short Answer Problems total 30 points
- Show your reasoning, write formulas where appropriate (short answer)
- If you miss one part of the short answer, but need the number for the next part, make up a number and proceed

### Formula List:

- $F = ma$
- $\text{weight} = mg$ , with  $g \approx 10 \text{ m/s}^2$
- $P.E. = mgh$
- $K.E. = \frac{1}{2}mv^2$
- $W = F \cdot d$
- typical heat capacities range from about 1000–4000 J/kg/°C
- $P = \sigma AT^4$ ;  $\sigma = 5.67 \times 10^{-8} \text{ W/m}^2/\text{K}^4$ ;  $T$  in Kelvin
- $T(^{\circ}\text{K}) = T(^{\circ}\text{C}) + 273$ ;  $T(^{\circ}\text{C}) = \frac{5}{9}[T(^{\circ}\text{F}) - 32]$
- $F_{\text{drag}} = \frac{1}{2}c_D\rho Av^2 = 0.65Av^2$  in air;  $A$  in  $\text{m}^2$ ,  $v$  in  $\text{m/s}$
- $F_{\text{elec}} = \frac{kq_1q_2}{r^2}$ ;  $k = 9 \times 10^9$ ;  $q$  in Coulombs,  $r$  in meters
- $f = \frac{1}{2\pi}\sqrt{\frac{k}{m}}$
- $V = IR$
- $P = VI$

### Complex Units:

- Newtons:  $\text{N} = \text{kg}\cdot\text{m/s}^2$
- Joules:  $\text{J} = \text{N}\cdot\text{m} = \text{kg}\cdot\text{m}^2/\text{s}^2$
- Watts:  $\text{W} = \text{J/s} = \text{kg}\cdot\text{m}^2/\text{s}^3$
- Volts:  $\text{V} = \text{J/C}$  (C is Coulombs)
- Amperes:  $\text{A} = \text{C/s}$