Answers to exams given by Professor Mallinckrodt
Physics 132—Spring 2005

Midterm

1. a) 7.64 cm b) 45.4 cm/s
2. a) Force b) i. Yes ii. No
3. a) 7.8 mm/s^2 b) About 20 s c) 5.5 km
4. a) 8.16 m b) 14.0 s

   EC: 5.0 kPa
5. a) 8.71 g/m b) 4.93 km/s^2 c) 3.22 W

   EC: $\frac{\lambda_{bottom}}{\lambda_{top}} = 0.604$
6. 2.17 *a*

Final Exam

1. a) 1.57 s b) 1.60 m/s c) 20 cm
2. a) $\sqrt{3}a$ b) $\left(1+\frac{\sqrt{3}}{3}\right)\frac{GM^2}{a^2}$ c) $2\pi\sqrt{\frac{a^3}{\left(1+\frac{\sqrt{3}}{3}\right)GM}}$ d) 291 days
3. a) 17.7 m/s b) 176 kPa
4. a) 1.13 W b) 89.5 dB
5. a) 0.383 g/m b) 70.5 N c) 990 Hz d) $\frac{16}{9} = 1.78$
6. 35.2!°C
7. a) 1 and 2 b) 9.24 p_iV_i c) 4.16 p_iV_i

   d) 0.450 (to be compared with 0.667)

   EC: Efficiency would have been higher because *all* of the exhaust is output to the lowest possible temperature.