

**Answers to exams given by Professor Mallinckrodt  
Physics 132—Winter 2002**

---

*Midterm*

1.

SI units	dimensions
Pa = N/m <sup>2</sup>	M/LT <sup>2</sup>
N/m	M/T <sup>2</sup>
N · m <sup>2</sup> /kg <sup>2</sup>	L <sup>3</sup> /MT <sup>2</sup>

2. 3.60 N

3. 12 rad/s

EC:  $a = 30 \text{ m/s}^2$ ,  $E = 16 \text{ J}$ ,  $v_{\text{max}} = 3.54 \text{ m/s}$

4. b) 17.3 km/s                      c)  $1.88 \times 10^{27} \text{ kg}$

5. a) 9.90 m/s                      b) 11.9 min

EC: To the level of the water surface in any event.

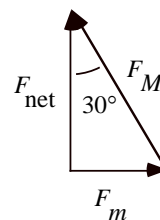
6.  $\frac{GM^2}{d(d+L)}$

EC:  $\sim \frac{GM^2}{d^2}$

7. b) See at right

c)  $F_M / F_m = 2$

d)  $M = 2m$



*Final Exam*

1.

SI units	dimensions
Pa = N/m <sup>2</sup>	M/LT <sup>2</sup>
N/m	M/T <sup>2</sup>
N · m <sup>2</sup> /kg <sup>2</sup>	L <sup>3</sup> /MT <sup>2</sup>

2. a) 13.5 cm/s

b) 168 kPa

3. b) 95.5 N

4. a)  $\frac{GM^2}{(b-a/2)(b+a/2)}$

EC:  $\sim \frac{GM^2}{b^2}$

5. a) 8.0 W

b) 11.6 hr

EC: +83 J/K

6. b)  $3.82 \sqrt{D^3 / GM}$

7. a) See graph at right above

c)  $Q_{AB} = 0$ ,  $Q_{BC} = 950 \text{ J}$ ,  $Q_{CA} = -673 \text{ J}$

d)  $W = 276 \text{ J}$

e) 29.1%

f) 51.9%

