

ME 328 – Machine Design  
 Exam 2– Closed book, closed notes, NO calculator  
 Possible points 60pts (plus 2 pts extra credit)

This exam is MY work, and my work ONLY:

Signature:

Print name:

**For full credit, you must show units at every step and show variable form of equations before inserting values. Values must include units at every step. Since you do not have a calculator, you do not need to calculate the answer, but solve it symbolically (with variables only) and then include appropriate numbers so that if you had a calculator it would be a matter of simple number crunching. If you don't have values for all parameters, leave them as variables in your final equation. If you cannot calculate answers with the information provided in this exam, explain why and/or what information would be required.**

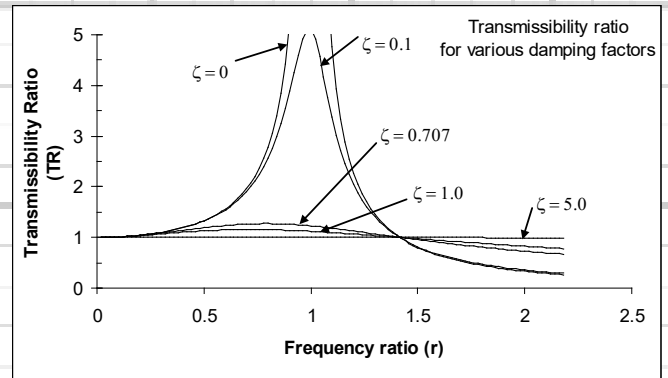
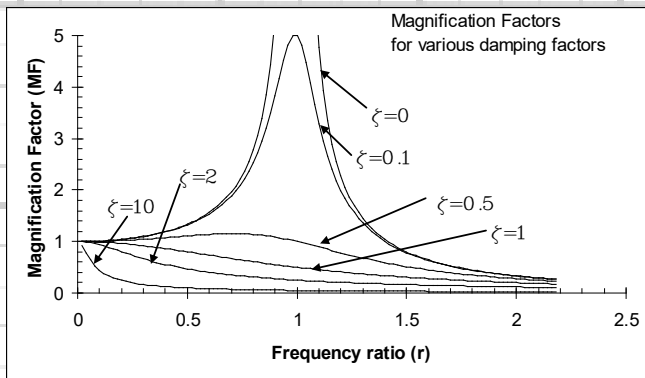
Some equations and graphs:

$$F=ma, KE = \frac{1}{2} mv^2, PE = mgh, E=mc^2, C=\pi D, A=\pi D^2/4, I=1/12 bh^3, J=\pi D^4/32$$

$$\delta_{\max} = \delta_{st} K \quad P = WK \quad K = \left\{ 1 + (1 + 2h/\delta_{st})^{1/2} \right\}$$

$$m\ddot{x} = -kx - c\dot{x} + P(t); P(t) = P_0 \sin(\omega t); c_c = 2m\omega_n; \zeta = c/c_c; \omega_n = (k/m)^{1/2}$$

$$MF = \frac{X}{X_o} = \frac{1}{\sqrt{(1-r^2)^2 + (2\zeta r)^2}}; TR = \frac{F_T}{P_o} = \frac{\sqrt{1+(2\zeta r)^2}}{\sqrt{(1-r^2)^2 + (2\zeta r)^2}}; P = T_1\omega_1 = T_2\omega_2$$



**THE ABOVE WILL BE PROVIDED ON THE EXAM.**

**The exam will cover homework 5 (impact) and 6 (vibrations I)**