EXPERIMENT # 7

Student's Name _____ Group #_____

Instructor's Name _____ Date Exp. Performed_____

Table I Measurements and Calculations

COMPONENT	mass (lb-s^2/in.)	LENGTH (in.)	CALCULATION
Rigid Bar	m_B = GIVEN	L_B = 2' 6"	I_B = EQUATIONS
Motor	m_M =	L_M = 10.5"	I_M =
Dashpot	m_D =	L_D = 1' 8"	I_D =
Rotating Mass	m_e = .00145	r = 3in	
	Stiffness (lb/in.)		I = 18.24
Spring	k = 6.5	L_S = 2' 2"	kL_S^2 = 4394 in^2
			$\omega_n = \sqrt{\frac{kL_S^2}{I}} = \sqrt{\frac{6.5 \times 26^2}{}} = 18.217 \frac{RAD}{S}$

$in^2 \cdot \frac{lb}{in}$

DEFLECTION = $\frac{F}{\beta}$

9-8 4/32

Table II Zeta and Damping Constant Calculations

ζ, using Eq. (7.9)	ζ=
ζ, using Eq. (7.10)	ζ=
% Difference	
Damping Constant	c =

Motor Speed (rpm)	ω_f (rad/s)	x_B (in.)	$\beta = \omega_f / \omega_n$	$\mathrm{MF} = \frac{I}{L_B L_M m_e} \frac{x_B}{r}$
40	4.19	4/32		
80	8.38			
140	14.66	2/16		
160	16.76			
170	17.80	5/16		
175	18.33			
180	19.37	9/16		
185				
190	19.9	2.0		
195				
200		4/16		
205				
210				
220		2/16		
240				
260		1/16		
300				
350		2/16		
400				
450				
500		3/16		
550				
600		3/16		