APPENDIX 1 / *LAMPIRAN 1*

Fundamental Equations in Vibration

1. $\zeta = \dfrac{c}{2m\omega_n}$;

2. $x(t) = Ce^{-\zeta\omega_n t}\sin(\omega_d t + \psi)$; $\omega_d = \sqrt{1-\zeta^2}\omega_n$

$$C = \sqrt{x_0^2 + \frac{(\dot{x}_0 + \zeta\omega_n x_0)^2}{(1-\zeta^2)\omega_n^2}} \quad ; \ \psi = \tan^{-1}\frac{\sqrt{1-\zeta^2}\omega_n x_0}{\dot{x}_0 + \zeta\omega_n x_0}$$

3. For $F(t) = me\omega^2 \sin\omega t$

$$X = \frac{me\omega^2}{\sqrt{(k-M\omega^2)^2 + (c\omega^2)^2}}; \quad \phi = \tan^{-1}\left[\frac{c\omega}{k-M\omega^2}\right]$$

$$\frac{F_T}{F_0} = \left[\frac{1+(2\zeta r)^2}{(1-r^2)^2 + (2\zeta r)^2}\right]^{1/2}$$

4. For $y = Y\sin\omega t$,

$$\frac{X}{Y} = \left[\frac{1+(2\zeta r)^2}{(1-r^2)^2 + (2\zeta r)^2}\right]^{1/2} \qquad \phi = \tan^{-1}\left[\frac{2\zeta r^3}{1+(4\zeta^2-1)r^2}\right]$$

$$\frac{F_T}{kY} = r^2\left[\frac{1+(2\zeta r)^2}{(1-r^2)^2 + (2\zeta r)^2}\right]^{1/2}$$

5. $\begin{pmatrix} a & b \\ c & d \end{pmatrix}^{-1} = \begin{pmatrix} d & -b \\ -c & a \end{pmatrix}\frac{1}{\Delta(\omega)}$; $\det\begin{pmatrix} a & b \\ c & d \end{pmatrix} = ad - bc$

6. For cantilever beam with load P at the free end, $\delta_{max} = PL^3(3EI)^{-1}$

7. For cantilever beam with uniform load w, $\delta_{max} = wL^4(8EI)^{-1}$

APPENDIX 2 / *LAMPIRAN 2*

Sound Pressure Level

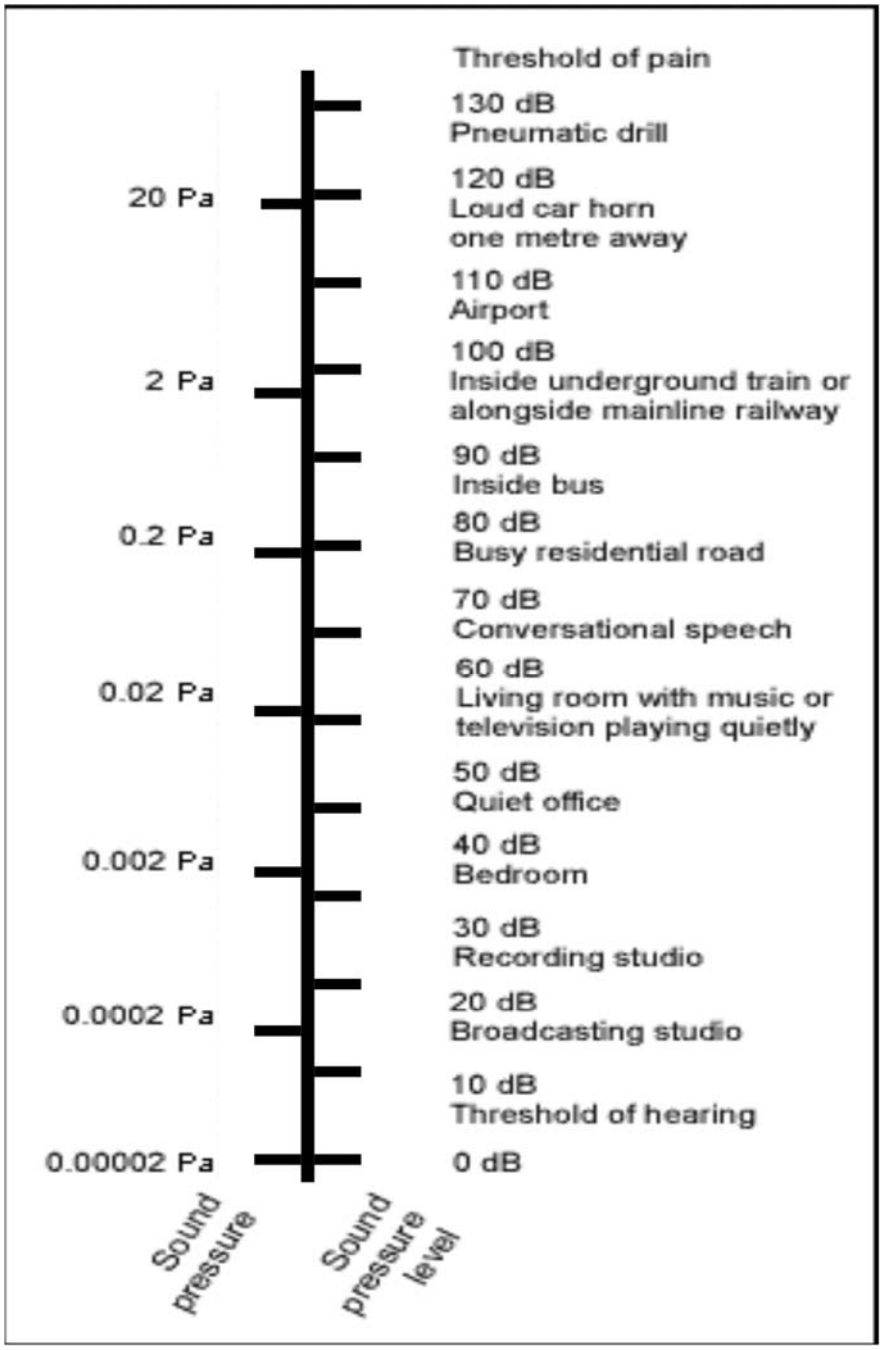

Figure Q5[a]: Sound Pressure Level
Rajah S5[a]: Paras Tekanan Bunyi

APPENDIX 3 / *LAMPIRAN 3*

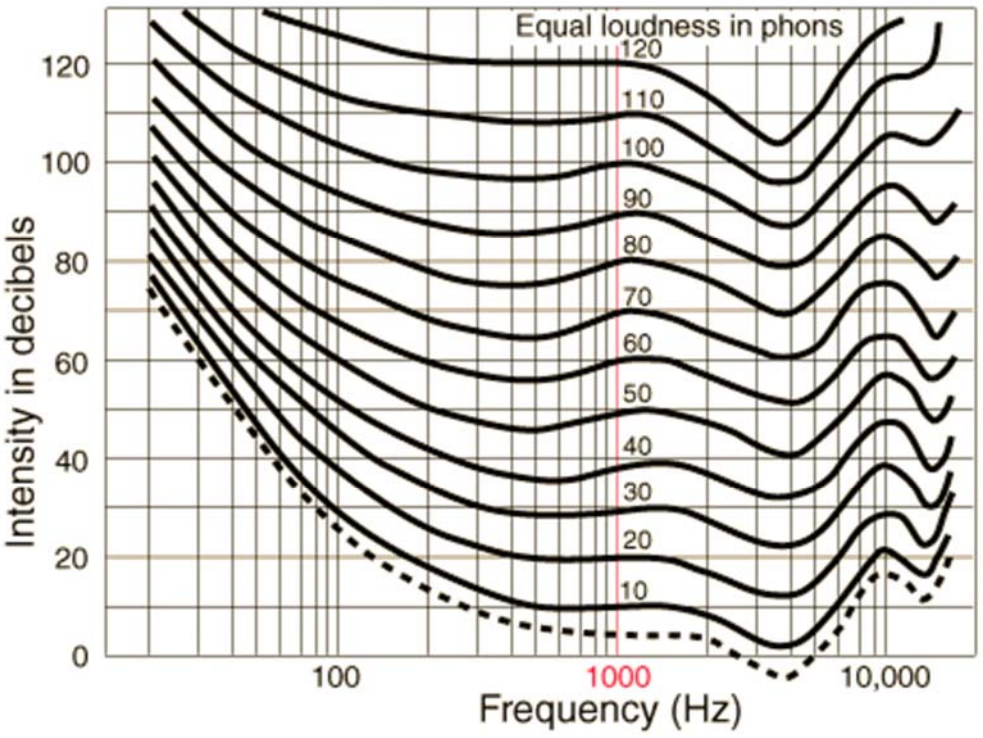

Figure Q5[c]: Equal Loudness Curves
Rajah S5[c]: Lengkungan Sama Nyaring

APPENDIX 4 / *LAMPIRAN 4*

Energy Attenuation Constant for Air

(a) 4m (1/ft)

Relative Humidity	Temperature °C(°F)	2,000 Hz	4,000 Hz	6,300 Hz	8,000 Hz
30%	15 (59)	0.0044	0.0148	0.0322	0.0410
	20 (68)	0.0036	0.0116	0.0256	
	25 (77)	0.0035	0.0095	0.0209	
	30 (86)	0.0034	0.0086	0.0172	
50%	15 (59)	0.0030	0.0087	0.0191	0.0260
	20 (68)	0.0020	0.0074	0.0153	
	25 (77)	0.0029	0.0072	0.0135	
	30 (86)	0.0028	0.0071	0.0130	
70%	15 (50)	0.0027	0.0068	0.0138	0.0184
	20 (68)	0.0026	0.0065	0.0122	
	25 (77)	0.0026	0.0064	0.0118	
	30 (86)	0.0025	0.0063	0.0117	

(b) 4m (1/m)

30%	15 (59)	0.0143	0.0486	0.1056	0.1360
	20 (68)	0.0119	0.0379	0.0840	
	25 (77)	0.0114	0.0313	0.0685	
	30 (86)	0.0111	0.0281	0.0564	
50%	15 (59)	0.0099	0.0286	0.0626	0.0860
	20 (68)	0.0096	0.0244	0.0503	
	25 (77)	0.0095	0.0235	0.0444	
	30 (86)	0.0092	0.0233	0.0426	
70%	15 (59)	0.0088	0.0223	0.0454	0.0600
	20 (68)	0.0085	0.0213	0.0399	
	25 (77)	0.0084	0.0211	0.0388	
	30 (86)	0.0082	0.0207	0.0383	