SOLUCIÓN (FÍSICA EXPERIMENTAL)

Problema 1

Variable dependiente: posición (h)
Variable independiente: tiempo^2 (t^2)

h [m] Y	t [s] X	X^2	XY
1.0	0.45	0.041	0.2025
1.5	0.54	0.085	0.4374
2.0	0.64	0.1677	0.8192
2.5	0.72	0.2687	1.296
5.0	1.00	1	5
ΣY=12	ΣX=2.4221	Σ X^2=1.5624	Σ XY=7.7551

$$m = \frac{5(7.7551) - 2.4221(12)}{5(1.5624) - (2.4221)^2} = \frac{9.7103}{1.9454} = 4.99$$

$$b = \frac{12(1.5624) - 7.7551(2.4221)}{5(1.5624) - (2.4221)^2} = \frac{-0.034}{1.9454} = -0.0179$$

Modelo matemático lineal: $h = 4.99t^2 - 0.0179$

$$v = 2(4.99)t = 9.98t$$

$$a = 9.98\ [m/s^2]$$

$$\%EE = \left|\frac{9.78 - 9.98}{9.78}\right| x100 = 2.044$$

$$\%E = 100 - \%EE = 97.95\%$$

Problema 2

Variable dependiente: P_{man}
Variable independiente: Profundidad (h)

P_{man} [Pa] Y	h [m] X	X^2	XY
255	0.02	0.0004	5.1
410	0.04	0.0016	16.4
600	0.06	0.0036	36
800	0.08	0.0064	64
1000	0.10	0.01	100
1200	0.12	0.0144	144
ΣY=4265	ΣX=0.42	Σ X^2=0.0364	Σ XY=365.5

$$m = \frac{6(365.5) - 0.42(4265)}{6(0.0364) - (0.42)^2} = \frac{401.7}{0.042} = 9564.28$$

$$b = \frac{4265(0.0364) - 365.5(0.42)}{6(0.0364) - (0.42)^2} = \frac{1.736}{0.042} = 41.33$$

Modelo matemático lineal: $P_{man} = 9564.28h + 41.33$

$$\frac{dP}{dh} = \rho g = 9564.28$$

$$\rho = \frac{9564.28}{9.78} = 977.94 \cong 1000$$

$\rho_{agua} = 1000\ [kg/m^3]$, el líquido es agua

$$\delta = \frac{477.94}{1000} = 0.47794$$

$$\gamma = \rho g = 9564.28$$

$$\upsilon = \frac{1}{977.94} = 1.022x10^{-3}$$

Problema 3

a) Para el modelo matemático:

I [A]	Fm [N]
0	0
1	1.2714×10^{-3}
2	2.1516×10^{-3}
3	3.3252×10^{-3}
4	4.2054×10^{-3}

$$Fm[N] = 1.046x10^{-3}\left[\frac{N}{A}\right] I[A] + 9.78x10^{-5}[N]$$

b) $Fm = 1.046x10^{-3}(2.5) + 9.78x10^{-5}$

$Fm = 2.7128x10^{-3}[N]$

c) $Fm = B\ I\ L\ sen\theta$

$m = B\ L\ sen\theta$

$$B = \frac{m}{L\ sen\theta} = \frac{1.046 \quad ^{-3}}{(0.08)sen(\quad ^{\circ})} = 0.0130\ [T] = 13\ [mT]$$

Problema 4

a) Sabiendo que $\lambda = \frac{V_P}{f}$ $\qquad V_P = \frac{l}{t} = \frac{3}{0.2} = 15\left[\frac{m}{s}\right]$

$$\lambda = \frac{15\ [m/s]}{60\ [Hz]} = 0.25\ [m]$$

b) Para el número de onda $k = \frac{2\pi}{\lambda} = \frac{2\pi}{0.25} = 8\pi\ [ra\ \ /m]$