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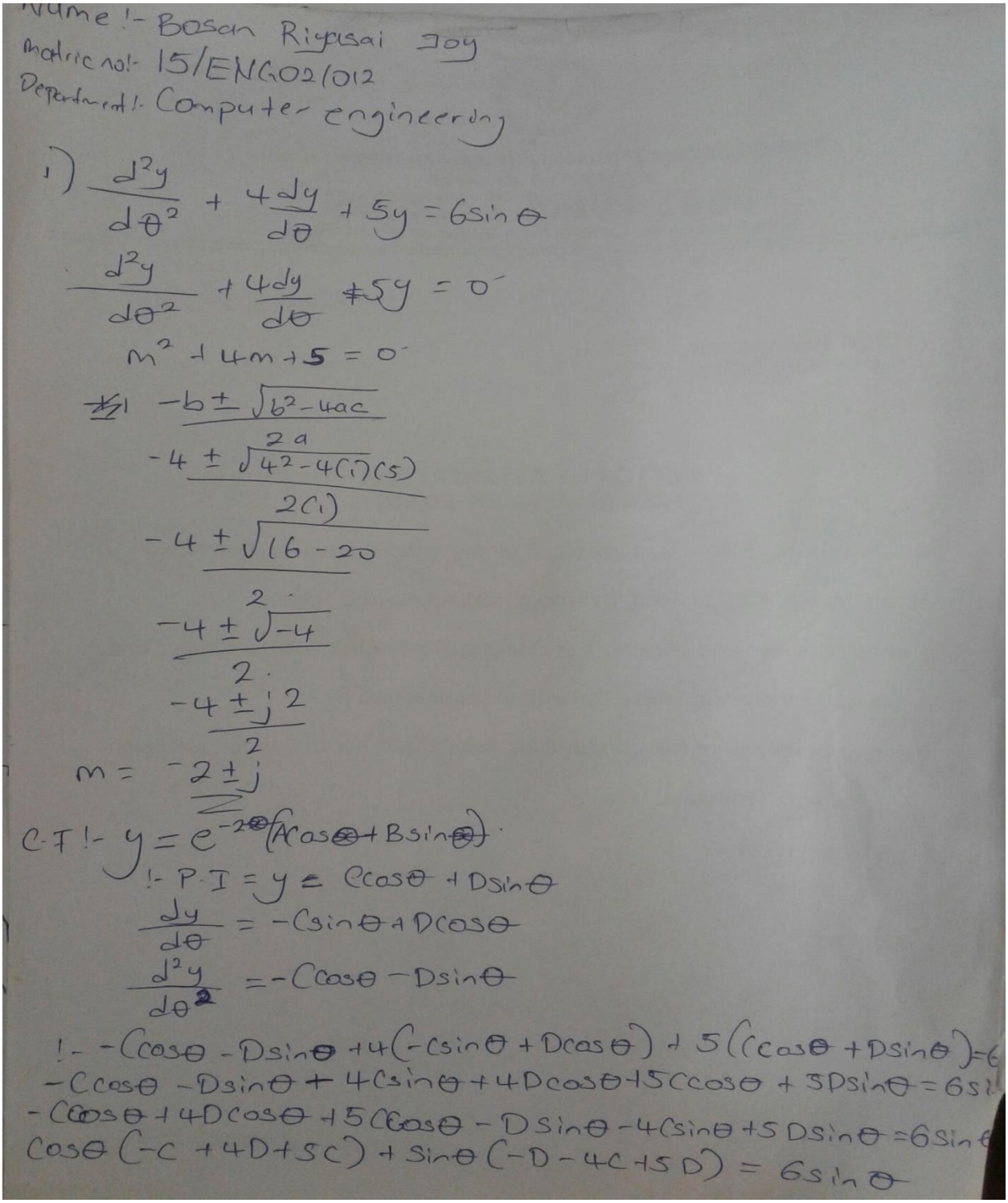
DEPARTMENT: COMPUTER ENGINEERING

MATRIC NO.: 15/ENG02/012



Therefore Comparing Coefficients

$C + 4D + 5C = 0$

$-D + 4C + 5D = 6$

$\therefore -4D + 4C = 0$ ——— (i)

$-4C + 4D = 6$ ——— (ii)

$$\begin{array}{r} -4D + 4C = 0 \\ 4D - 4C = 6 \\ \hline 0 \quad 8C = -6 \end{array}$$

$$\frac{8C}{8} = \frac{-6}{8}$$

$$\therefore C = \frac{-3}{4}$$

$$\therefore -4D + 4\left(\frac{-3}{4}\right) = 0$$

$$4D + (-3) = 0$$

$$4D = 3$$

$$D = \frac{3}{4}$$

$$\therefore P.I; \quad y = \frac{-3}{4}\cos\theta + \frac{3}{4}\sin\theta$$

$$y = \frac{3}{4}(-\cos\theta + \sin\theta)$$

$$\therefore G.S = C.F + P.I$$

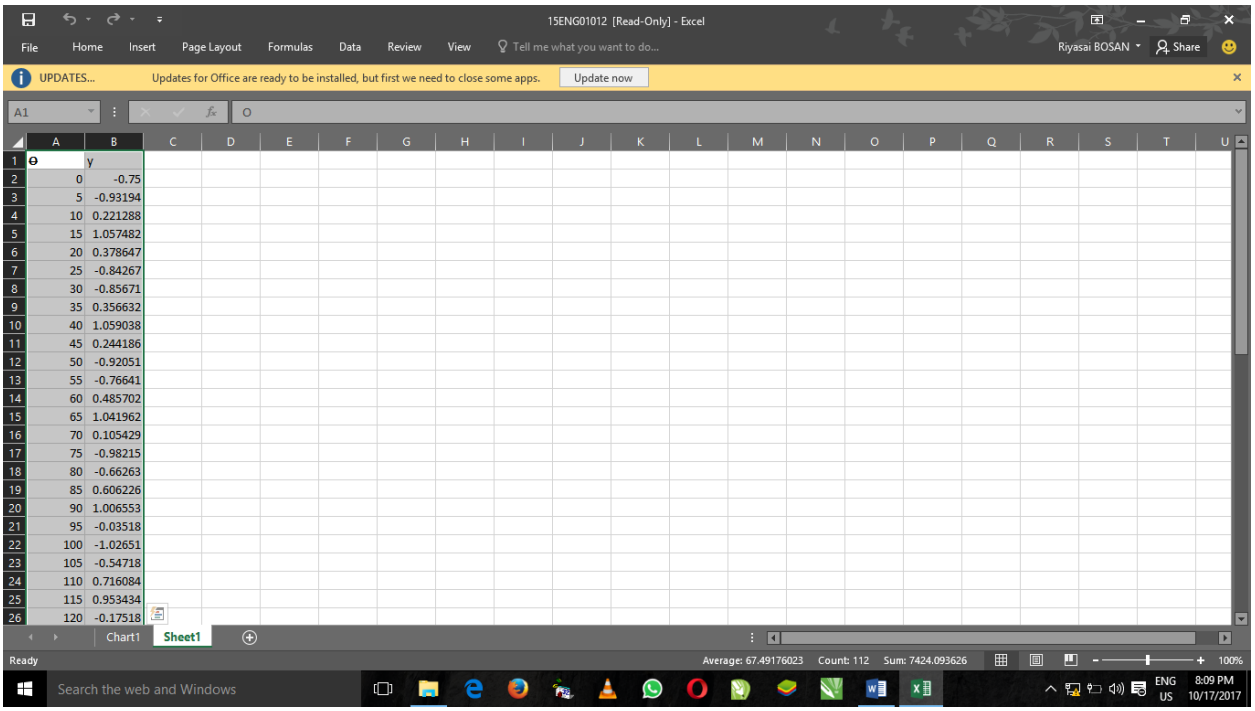
$$y = e^{-2\theta}(A\cos\theta + B\sin\theta) + \frac{3}{4}(-\cos\theta + \sin\theta)$$

$$y = e^{-2\theta}(A\cos\theta + B\sin\theta) + 0.75(-\cos\theta + \sin\theta)$$

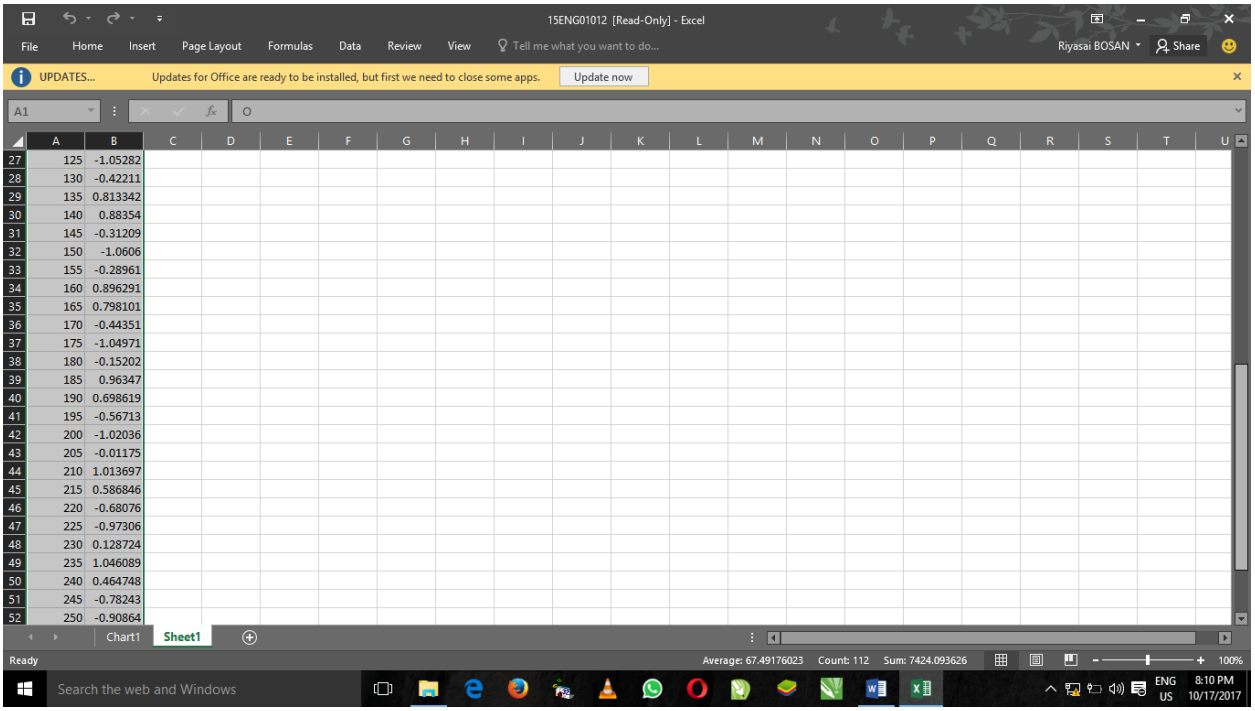
ii) Neglating the C.F

model $y = 0.75(-\cos\theta + \sin\theta) = -0.75[\cos\theta - \sin\theta]$

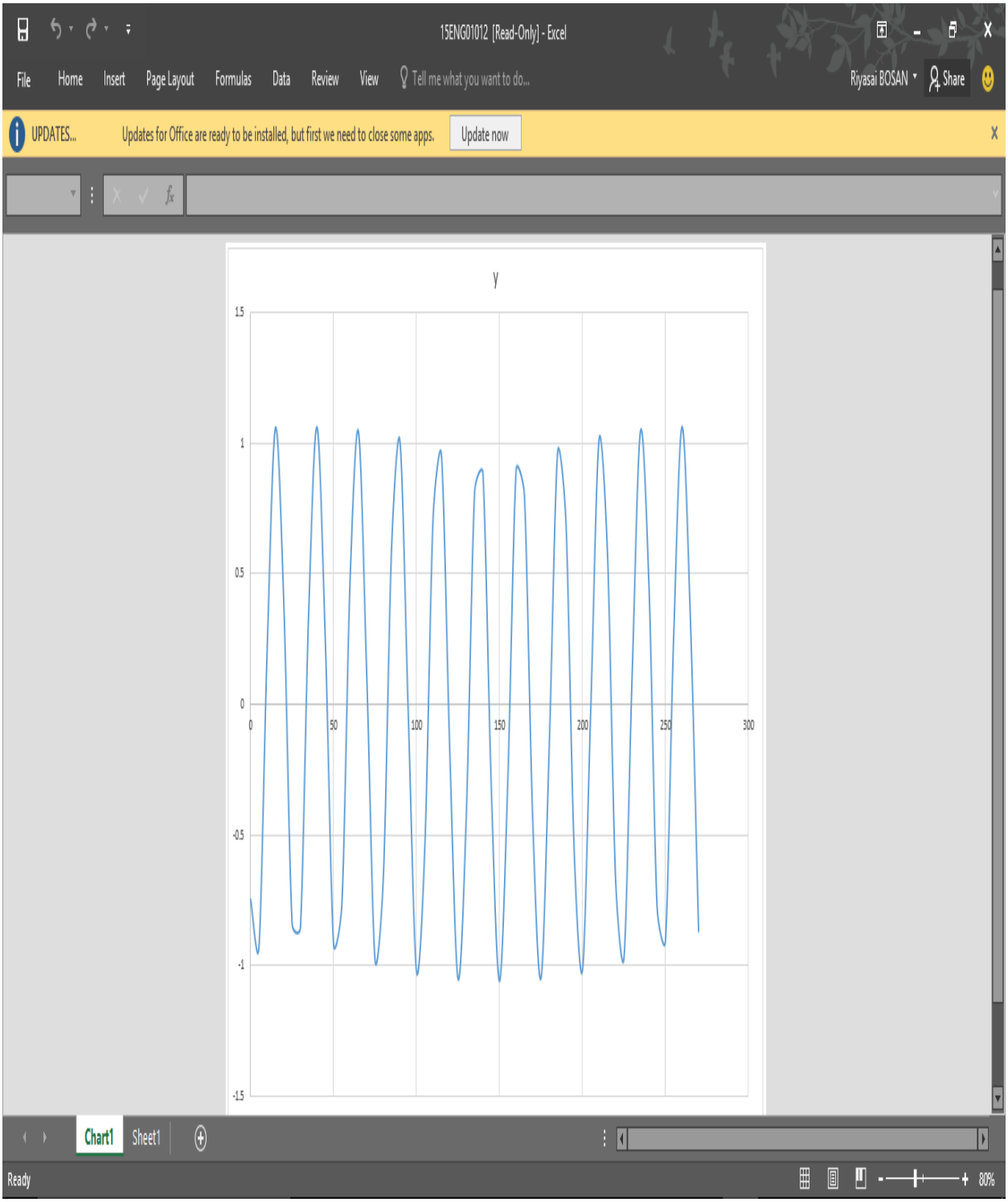
From 0° to 270°



	A	B
1	θ	y
2	0	-0.75
3	5	-0.93194
4	10	0.221288
5	15	1.057482
6	20	0.378647
7	25	-0.84267
8	30	-0.85671
9	35	0.356632
10	40	1.059038
11	45	0.244186
12	50	-0.92051
13	55	-0.76641
14	60	0.485702
15	65	1.041962
16	70	0.105429
17	75	-0.98215
18	80	-0.66263
19	85	0.606226
20	90	1.006553
21	95	-0.03518
22	100	-1.02651
23	105	-0.54718
24	110	0.716084
25	115	0.953434
26	120	-0.17518



	A	B
27	125	-1.05282
28	130	-0.42211
29	135	0.813342
30	140	0.88354
31	145	-0.31209
32	150	-1.0606
33	155	-0.28961
34	160	0.896291
35	165	0.798101
36	170	-0.44351
37	175	-1.04971
38	180	-0.15202
39	185	0.96347
40	190	0.698619
41	195	-0.56713
42	200	-1.02036
43	205	-0.01175
44	210	1.013697
45	215	0.586846
46	220	-0.68076
47	225	-0.97306
48	230	0.128724
49	235	1.046089
50	240	0.464748
51	245	-0.78243
52	250	-0.90864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at steady state $\theta = \infty \quad \frac{dy}{dx} = 0$

$\frac{dy}{dx} = -2e^{-2\theta} A\cos\theta + e^{-2\theta} \cdot -A\sin\theta + -2e^{-2\theta} B\sin\theta$

$\frac{dy}{dx} = e^{-2\theta} B\cos\theta + \frac{3}{4}(\sin\theta + \cos\theta)$

$\frac{dy}{dx} = -2e^{-2\theta} A\cos\theta - e^{-2\theta} A\sin\theta - 2e^{-2\theta} B\sin\theta$

$e^{-2\theta} B\cos\theta + 3/4(\sin\theta + \cos\theta).$

$0 = -2e^{-2\infty} A\cos\infty - e^{-2\infty} + A\sin\infty - 2e^{-2\infty} B\sin\infty$

$-e^{-2\infty} B\cos\infty + 3/4(\sin\theta + \cos\theta).$

$0 = 0 - 0 - 0 - 0 + 3/4(\sin\theta + \cos\theta).$

$-\frac{3}{4}\sin\theta + \frac{3}{4}\cos\theta = 0$

Comparing Coefficients

$\theta = 0^0$

$$EI\frac{d^2y}{dx^2} = \frac{w}{2}(L-x)^2$$

$$EI\frac{d^2y}{dx^2} = 0$$

$$EI\,m^2 = 0$$

$$m^2 = \frac{0}{EI}$$

$$\sqrt{m^2} = \sqrt{0}$$

$$m = 0 \quad [\text{twice}]$$

$$\therefore y = e^{0x}(A + Bx).$$

$$y = (A + Bx) \quad \text{——} \quad C.F.$$

$$P.I = Cx^4 + Dx^3 + Ex^2 = y$$

$$\frac{dy}{dx} = 4Cx^3 + 3Dx^2 + 2Ex$$

$$\frac{d^2y}{dx^2} = 12Cx^2 + 6Dx + 2E$$

$$\therefore EI[12Cx^2 + 6Dx + 2E] = \frac{w}{2}[L^2 - 2Lx + x^2]$$

Comparing Coefficients.

$$EI\,2E = \frac{wL^2}{2}$$

$$\therefore E = \frac{wL^2}{4EI}$$

$$\therefore EI\,6D = \frac{-w\,2L}{2}$$

$$D = \frac{-wL}{6EI}$$

$$EI\,12C = \frac{w}{2}$$

$$C = \frac{w}{24EI}$$

$$\therefore P.I = \frac{w}{24EI}x^4 + \frac{wL}{6EI}x^3 + \frac{wL^2}{4EI}x^2$$

$$\therefore = \frac{wx^4 - 4wLx^3 + 6wL^2x^2}{24EI}$$

$$= \frac{w}{24EI}[x^4 - 4Lx^3 + 6L^2x^2] \quad \text{——}$$

- G.S. $\therefore y = (A + Bx) + \frac{w}{24EI}(x^4 + 4Lx^3 + 6L^2x^2)$

at $y = 0 \quad x = 0$

$0 = A + 0 + \frac{w}{24EI}(0 - 0 + 0)$

$\therefore A = 0$

$\frac{dy}{dx} = B + \frac{w}{24EI}(4x^3 - 12Lx^2 + 12L^2x)$

at $\frac{dy}{dx} = 0 \quad , x = 0$

$\therefore 0 = B + \frac{w}{24EI}(0)$

$\therefore B = 0$

$\therefore y = (0 + 0x) + \frac{w}{24EI}(x^4 - 4Lx^3 + 6L^2x^2)$

$y = \frac{w}{24EI}(x^4 - 4Lx^3 + 6L^2x^2)$

$\therefore$ if $x = L$

$y = \frac{w}{24EI}(L^4 - 4L \cdot L^3 + 6L^2 \cdot L^2)$

$y = \frac{w}{24EI}(L^4 - 4L^4 + 6L^4)$

$y = \frac{w}{24EI}[3L^4]$

$y = \frac{3wL^4}{24EI}$

$y = \frac{wL^4}{8EI}$