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Mechanical Engineering

17 EN9006/101

EN9 282

Assignment I

$$* \frac{dy}{dt} = ky$$

$$\int \frac{dy}{y} = \int ky dt$$

$$\int \frac{dy}{y} = k \int dt$$

$$\ln y = kt + c$$

Taking exponential of both sides

$$e^{\ln y} = e^{kt+c}$$

$$y = e^{kt} \cdot e^c$$

where e^c is constant y_0

$$y = y_0 \cdot e^{kt}$$

$$y_0 = 20$$

$$\text{at } t = 5 \text{ hrs}$$

$$y = 2y_0 \rightarrow 2 \times 20 = 40$$

$$\text{Therefore: } 40 = 20e^{5k}$$

$$2 = e^{5k}$$

Taking \ln we have:

$$\ln 2 = 5k$$

$$k = \frac{\ln 2}{5} = 0.1386$$

$$\therefore y = 20e^{0.1386t}$$

$$\text{At } t = 1\frac{1}{2} = 36 \text{ hrs}$$

$$y = 20e^{0.1386(36)}$$

$$y = 20 \times 146.9$$

$$y = 2938$$

Book1 - Microsoft Excel

Chart Tools

Home Insert Page Layout Formulas Data Review View Design Layout Format

Change Chart Type Save As Chart Template Type

Switch Row/Column Select Data Data

Chart Layouts

Chart Styles

Chart 1

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
1	T	Y															
2		0	20														
3		0.25	20.70515														
4		0.5	21.43515														
5		0.75	22.1909														
6		1	22.97329														
7		1.25	23.78327														
8		1.5	24.6218														
9		1.75	25.4899														
10		2	26.3886														
11		2.25	27.319														
12		2.5	28.28219														
13		2.75	29.27934														
14		3	30.31165														
15		3.25	31.38036														
16		3.5	32.48675														
17		3.75	33.63214														
18		4	34.81792														
19		4.25	36.04551														
20		4.5	37.31638														
21		4.75	38.63205														
22		5	39.99411														
23		5.25	41.4042														
24		5.5	42.864														
25		5.75	44.37527														
26		6	45.93982														
		6.25	47.55953														



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Chart 1

	Y1	Y2	Y3													
0		10	30	50												
0.5	10.71758	32.15273	53.58788													
1	11.48665	34.45994	57.43323													
1.5	12.3109	36.9327	61.5545													
2	13.1943	39.58291	65.97151													
2.5	14.14109	42.42328	70.70547													
3	15.15583	45.46748	75.77914													
3.5	16.24337	48.73012	81.21687													
4	17.40896	52.22688	87.04481													
4.5	18.65819	55.97456	93.29094													
5	19.99706	59.99117	99.98528													
5.5	21.432	64.296	107.16													
6	22.96991	68.90973	114.8495													
6.5	24.61818	73.85453	123.0909													
7	26.38472	79.15416	131.9236													
7.5	28.27803	84.83408	141.3901													
8	30.30719	90.92158	151.536													
8.5	32.48197	97.4459	162.4098													
9	34.8128	104.4384	174.064													
9.5	37.31088	111.9327	186.5544													
10	39.98823	119.9647	199.9411													
10.5	42.85769	128.5731	214.2885													
11	45.93306	137.7992	229.6653													
11.5	49.22911	147.6873	246.1455													
12	52.76168	158.285	263.8084													
12.5	56.54773	169.6432	282.7387													

