

THE WEST AFRICAN
EXAMINATIONS COUNCIL
PATENT NO. 330 DING 20/2019
NOT FOR SALE

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MATHEMATICS
STRNG05/037

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ENG 282 ASSIGNMENT

- 1) Initially 150lb of salt is dissolved into 1200gal of water
- 2) There after 50gal of brine (mixture of salt & water) is dissolved in it per minute
- 3) Also 30 gal of brine leaves the tank per minute to

N-B As 1 gal of brine contains (1+5int) lb salt
i) As 50gal enters, 30 gal of brine leaves the tank every minute.

One gallon of brine entering the tank in one minute $t=1$

$$\begin{aligned} \text{Amount of salt } m &= 1+5int \\ m_1 &= 1+5in(1) \\ m_1 &= 1+0.0175 \\ m_1 &= \underline{\underline{1.0175}} \text{ lb of salt} \end{aligned}$$

\therefore Therefore the amount of salt in brine entering the tank is $50(1+5int)$ every minute
 $50(1+5in(1))$
 $= 50.89 \approx 51$ lb of salt

$$\frac{dm}{dt} = \frac{50(1+5int) - 30m}{1200}$$

$$m = 50(1+5int) - 0.025m$$

$$\frac{dm}{dt} = -0.025(M - 2040)$$

$$\int \frac{dm}{M-2040} = \int -0.025 dt$$

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$$\ln(M-2040) = -0.025t + C$$

$$M-2040 = e^{-0.025t+C}$$

$$M-2040 = e^{-0.025t} e^C$$

$$M-2040 = e^{-0.025t} M_0$$

$$M-2040 = M_0 e^{-0.025t}$$

Given that $t = 0$

$$(\text{Initially}) / M = 15015$$

$$150 = M_0 e^{0.025 \cdot 0} + 2040$$

$$150 - 2040 = M_0$$

$$M_0 = -1890$$

$$M = 1890 e^{-0.025t} + 2040$$

$$M = 2040 - 1890 e^{-0.025t}$$



mobile > CommandsExample > CommandsExample.m

```
1 commandwindow
2 clear
3 clc
4 close all
5 syms t
6 format short g
7 X= (50/0.05)+((50/1.0025)*sin(t))+((50*0.05/1.
8 X1= 1000- (800-exp(-0.05*t))
9 t= 0:1:500
10 t1=t(2:2:500)
11 t2=t(1:2:500)
12 X=subs(X,t1)
13 X1=subs(X1,t2)
14 mdata={'t(min)', 'g(gallon)';X,X1}
15 plot(t1,X,t2,X1)
16 grid on
17 grid minor
```



Figure 1: CommandsExample

