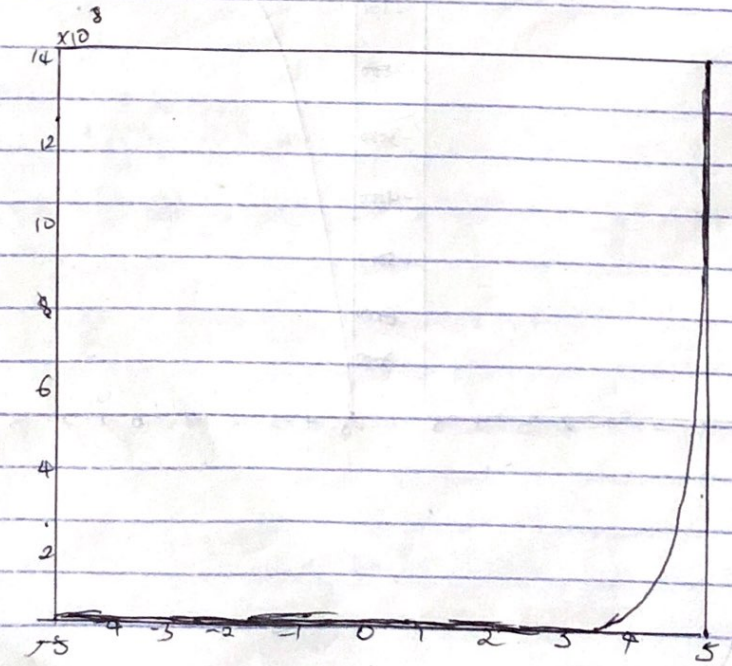
ELUWA TOCHUKWU DIVINE
17/ENG07/010
Petroleum Engineering

~~Assignment 4~~

4a) $\frac{d^2n}{dt^2} - \frac{dn}{dt} - 12n = 144t^3 + 12.5$

```
command window
clc
clear
Close all
syms n(t)
ode = diff(n, t)
ode1 = diff(n, t, 2) - diff(n,t) -12*n == 144*t^3 +12.5
cond = [n(0) == 5, ode(0) == 0.5]
ysoln = dsolve(ode1, cond)
ti = 0:0.1:1.5
fight = subs(ysoln, ti)
Plot(ti, Fight)
axis fight
Grid on
Grid minor
```



2b

```
Commandwindow
clear
clc
syms x(t) y(t)
ode1 = diff(y,t) - 2*x == exp(-2*t)
ode2 = diff(x,t) + y == exp(-t)
odes = [ode1, ode2]
Cond = [y(0) == 0, x(0) == 0]
[xsol(t) ysol(t)] = dsolve(odes, Cond)
figure (1)
fplot(xsol(t))
grid on
grid minor
figure (2)
fplot(ysol(t))
grid on
grid minor
```

Figure 1

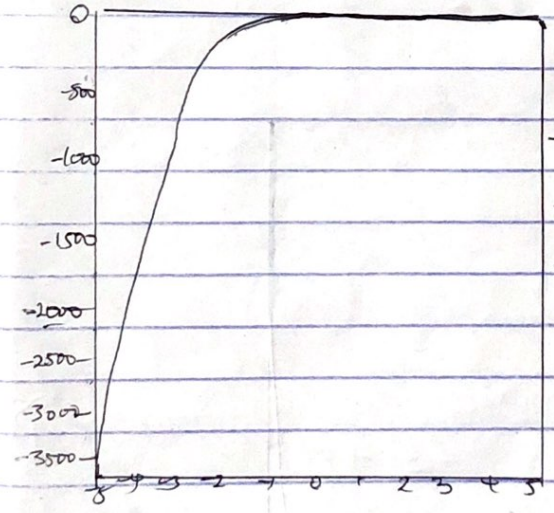
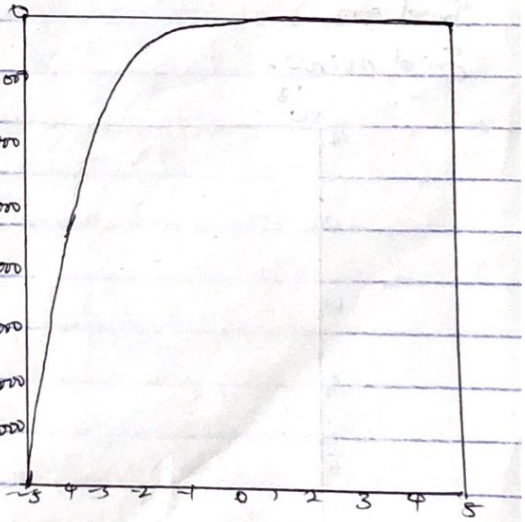
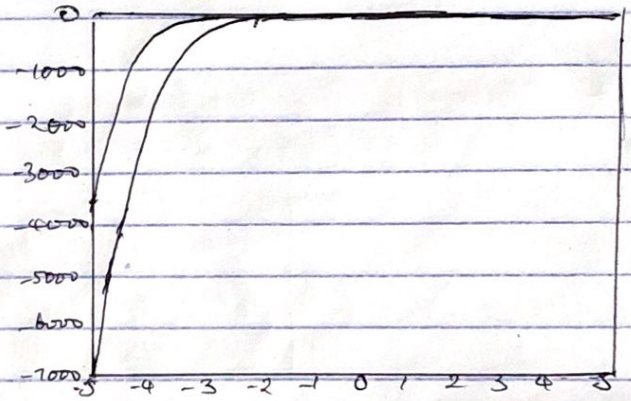


Figure 2



i) together.

```
Commandwindow
Clear
clc
Syms x(t) y(t)
ode1 = diff(y,t) - 2*x == exp(-2*t)
ode2 = diff(x,t) + y == exp(-t)
odes = [ode1, ode2]
Cond = [y(0) == 0, x(0) == 0]
[xsol(t) ysol(t)] = dsolve(odes, Cond)
fplot(xsol(t))
hold on
fplot(ysol(t))
grid on
grid major
```




```
for f(t)
```

4c) Commandwindow

```
clear
clc
Close all
Syms f(t) K a w
f(t) = K*exp(-a*t)*sin(5*w*t)*cos(3*w*t)
f(s) = laplace(f(t))
for f(s)
```

Commandwindow

```
clear
clc
Close all
Syms f(s)
f(s) = Pi/(3^2 + 13*Pi*5 + 2*Pi^3)
f(t) = ilaplace(f(s))
```