Frequency Modulated Signal:

Let, modulating voltage be given by,

$$v_{\mathrm{m}} = V_m \, \mathrm{Cos} \, \omega_m t$$

Let, the carrier voltage is given by,

$$v_{\mathrm{c}} = V_c \, Sin(\omega_c t + \theta)$$

So, the frequency modulated wave is given by,

$$s(t) = A_c \, Sin[2\pi f_c t + \frac{K_f}{f_m} A_m \, Sin(2\pi f_m t)] \, \text{----------} \, eq^n \, 3.44 \text{ from G.K. Mithal}$$

Code in Matlab:

```
clc;
clear all;
close all;

fm=25;
B=10;
t=0:0.0001:0.25;
m=cos(2*pi*fm*t);
subplot(3,1,1);
plot(t,m);
xlabel('Time');
ylabel('Amplitude');
title('Message Signal');
grid on;

fc=400;
c=sin(2*pi*fc*t);
subplot(3,1,2);
plot(t,c);
xlabel('Time');
ylabel('Amplitude');
title('Carrier Signal');
grid on;

y=sin(2*pi*fc*t+(B.*sin(2*pi*fm*t)));
subplot(3,1,3);
plot(t,y);
xlabel('Time');
ylabel('Amplitude');
title('FM Signal');
```

grid on;

Output: