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MATRIC NO: 16/ENG02/003

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QUESTION 2 SOLUTION

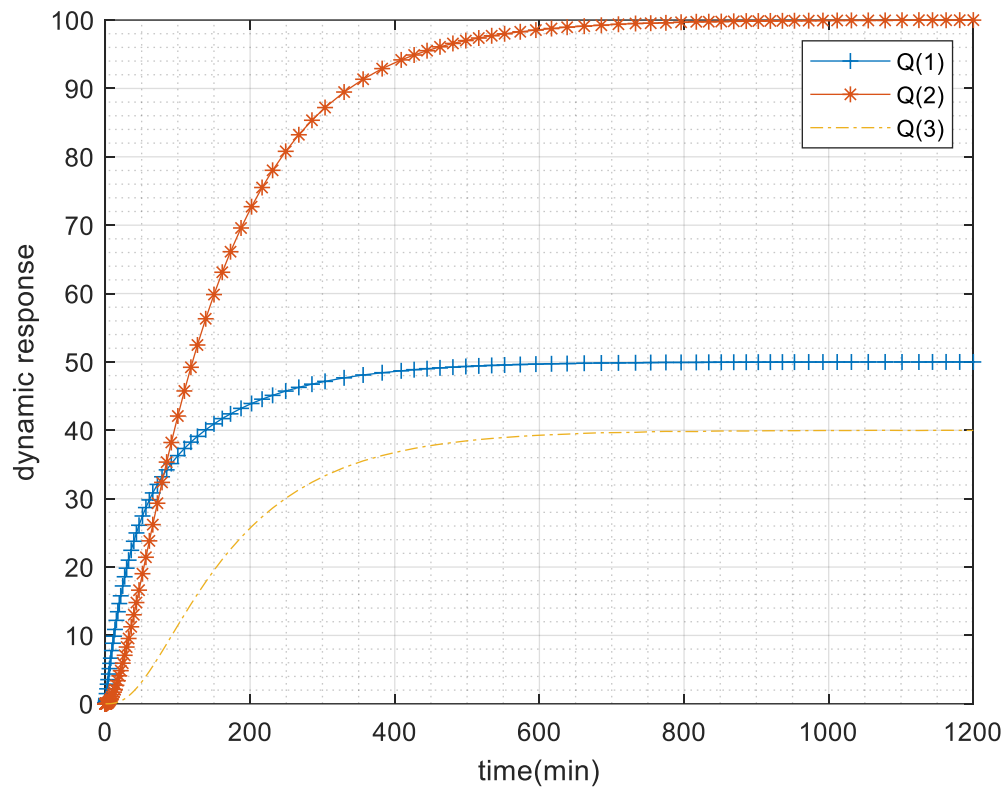
Matlab Codes

```
Function ma = man(t,Q)
%ap = [Q1;Q2;Q3]
ma(1,1)=(-15/500)*Q(1)+(5/1000)*Q(2)+1;
ma(2,1)=(15/500)*Q(1)-(18/1000)*Q(2)+(3/400)*Q(3);
ma(3,1)=(13/1000)*Q(2)-(13/400)*Q(3);
```

Code written in the command window

```
>> [t,Qv]=ode45('man',[0 1200],[0;0;0]),
    plot(t,Qv(:,1),'+-',t,Qv(:,2),'*-',t,Qv(:,3),'-.'),
    legend('Q(1)','Q(2)','Q(3)'),
    grid on,
    grid minor,
    xlabel('time(min)'),
    ylabel('dynamic response')
```

Graph Obtained



Steady State Values

For Q (1): From the graph above the steady state value is 100.

For Q (2): From the graph above the steady state value is 50.

For Q (3): From the graph above the steady state value is 40.