

NAME: NNAMAH JOHNPAUL

DEPARTMENT: ELECTRICAL ELECTRONICS ENGINEERING

MATRIC NO: 16/ENG04/034

ENG 382

QUESTION 2 SOLUTION

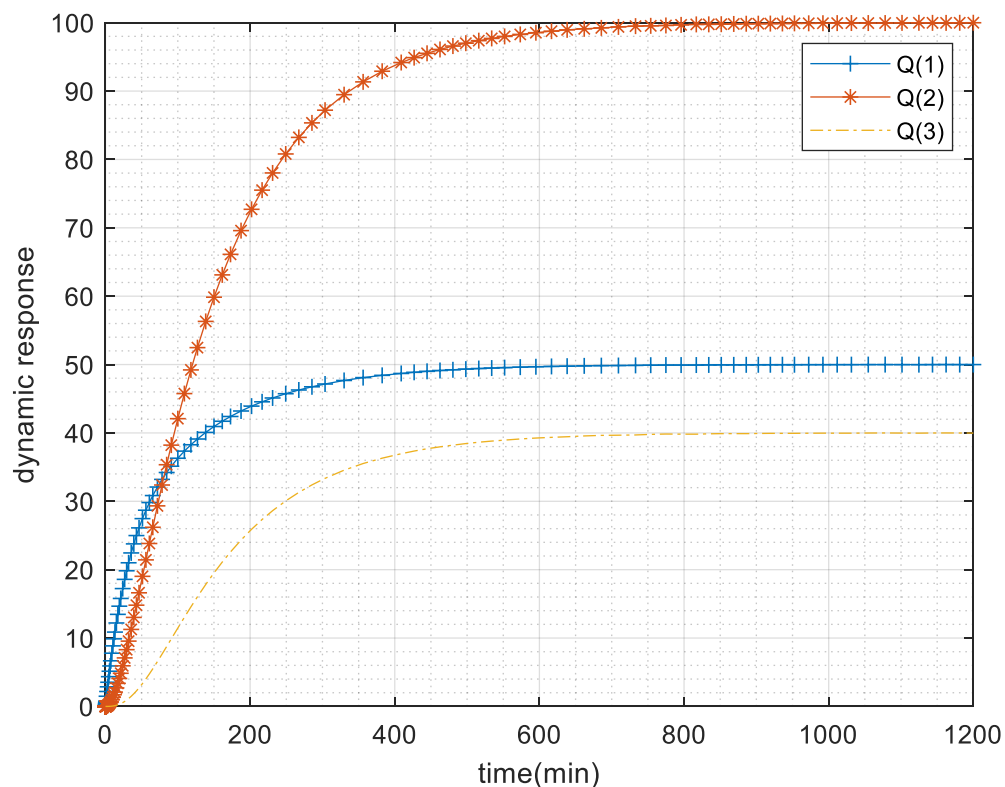
Matlab codes

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

Code written in the command window

```
>> [t,Qv]=ode45('sun',[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.