```
function Qbar = transReducedStiffnessMatrix(E1,E2,G12,v12,theta)
%This function finds the transformed reduced stiffness matrix at angle theta
    v21=(v12/E1)*E2;
    Q11=E1/(1-v12*v21);
    Q12=(v12*E2)/(1-v12*v21);
    Q21=Q12;
    Q22=E2/(1-v12*v21);
    Q66=G12;
    Q=[Q11 Q12 0; Q21 Q22 0; 0 0 Q66];

    stressTrans=[cosd(theta)^2 sind(theta)^2 2*cosd(theta)*sind(theta);...
                 sind(theta)^2 cosd(theta)^2 -2*cosd(theta)*sind(theta);...
                 -cosd(theta)*sind(theta) cosd(theta)*sind(theta)
(cosd(theta)^2)-(sind(theta)^2)];

    strainTrans=[cosd(theta)^2 sind(theta)^2 cosd(theta)*sind(theta);...
                 sind(theta)^2 cosd(theta)^2 -cosd(theta)*sind(theta);...
                 -2*cosd(theta)*sind(theta) 2*cosd(theta)*sind(theta)
(cosd(theta)^2)-(sind(theta)^2)];

    Qbar = (stressTrans)\Q*strainTrans;
end
```

Main test code:

```
clc;clear;
%AS/3501 graphite/epoxy
E1=138e9;
E2=9e9;
G12=6.9e9;
v12=0.3;
theta = [0 90 30 45 -45];

for i=1:length(theta)
    Qbar = transReducedStiffnessMatrix(E1,E2,G12,v12,theta(i));
    display(Qbar)
end
```

Output:

Qbar =

1.0e+11 *

1.3881	0.0272	0
0.0272	0.0905	0
0	0	0.0690

Qbar =

1.0e+11 *

0.0905 0.0272 0

0.0272 1.3881 0

0 0 0.0690

Qbar =

1.0e+10 *

8.4843 2.4248 4.0526

2.4248 1.9962 1.5663

4.0526 1.5663 2.8432

Qbar =

1.0e+10 *

4.5225 3.1425 3.2440

3.1425 4.5225 3.2440

3.2440 3.2440 3.5609

Qbar =

1.0e+10 *

4.5225 3.1425 -3.2440

3.1425 4.5225 -3.2440

-3.2440 -3.2440 3.5609