AE-681 Composite Materials
Assignment No. 4

In the following tables the material properties for transversely isotropic fibre and isotropic matrix are given.

Fibre Name	E_1(GPa)	$E_2=E_3$ (GPa)	G_{12} (GPa)	ν_{12}	ν_{23}
Carbon	232	15	24	0.279	0.49
AS4	225	15	15	0.2	0.25
T300	230	15	15	0.2	0.25
E-Glass	72.4	72.4	30.2	0.2	0.2
E-Glass 21xK43 Gevetex	80	80	33.33	0.2	0.2
E-Glass 1200tex	74	74	30.8	0.2	0.2

Matrix Name	E (GPa)	ν
Epoxy-1	3.45	0.35
Epoxy-2	5.35	0.35
3501-6 Epoxy	4.2	0.34
BSL914C epoxy	4.0	0.35
LY556/HT907/DY063 epoxy	3.35	0.35
Epoxy-3	2.76	0.35

1. Take the RVE with the volume fractions given to you. Take fibre shape as a circular cylinder.
2. Find the phase averaged stress concentration factors for fibre and matrix.
3. Verify whether the product of phase volumes and phase averaged stress concentration factors gives identity tensor.
4. Find the effective stiffness matrix.
5. Find the effective engineering constants for the composite.