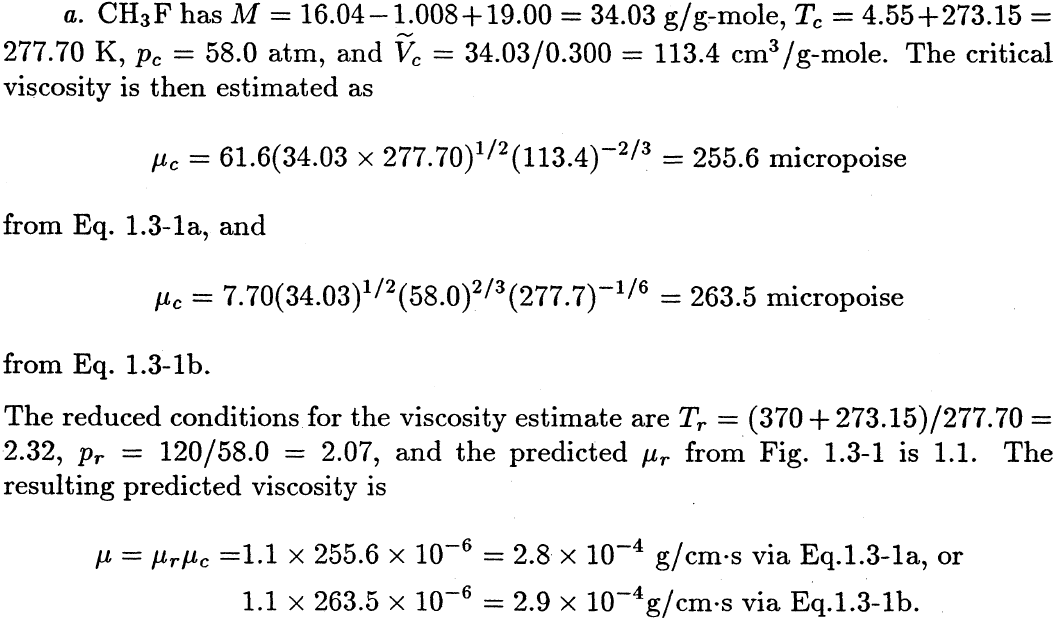
**Solution Manual for Chapter – 1**

**1A.1 Estimation of dense-gas viscosity.**

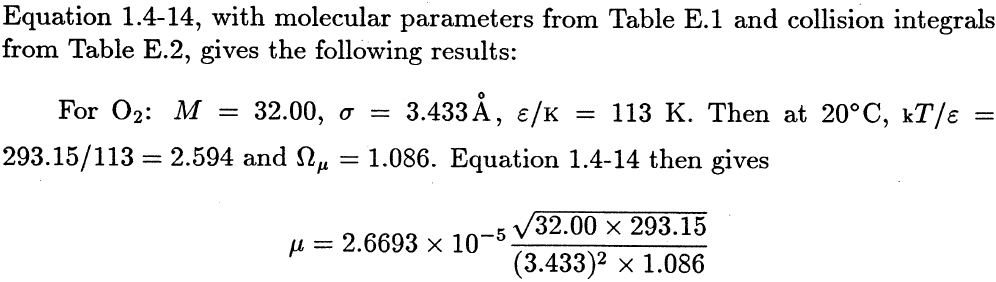
Table E.1 gives *Tc*=126.2 K, *pc*=33.5 atm, and for N2. The reduced conditions for the viscosity are then:

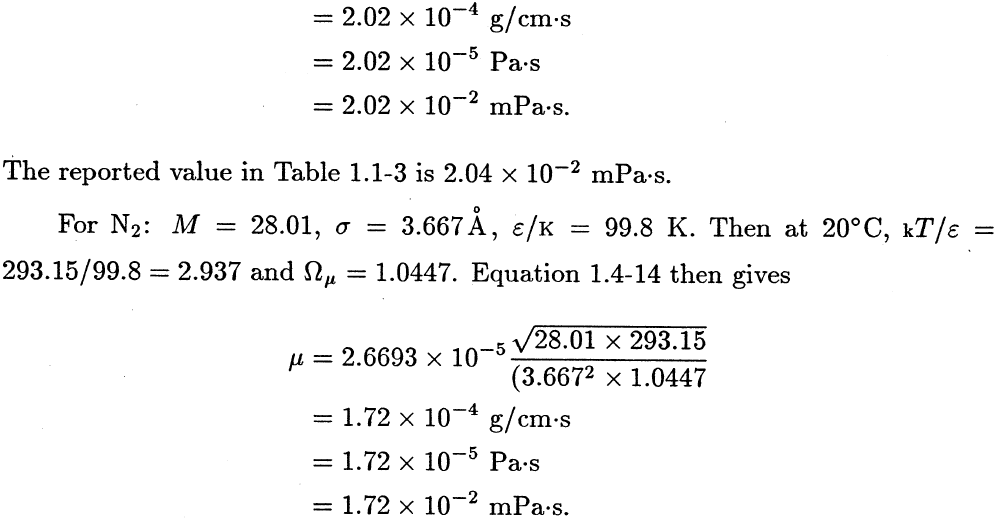
At this reduced state, Fig. 1.3-1 gives approximately . Hence, the predicted viscosity is .

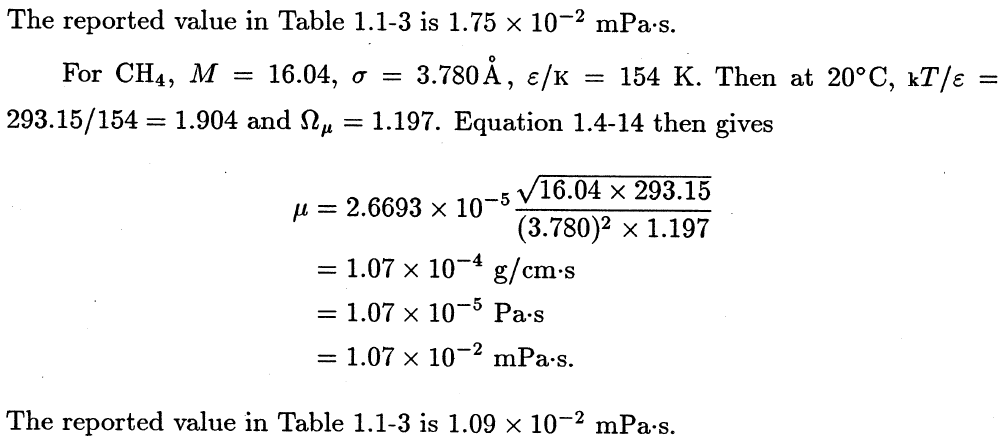
**1A.2 Estimation of the viscosity of methyl fluoride.**



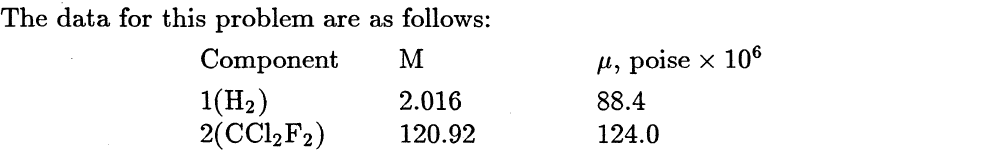
**1A.3 Computation of the viscosities of gases at low density.**

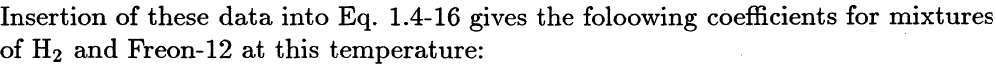
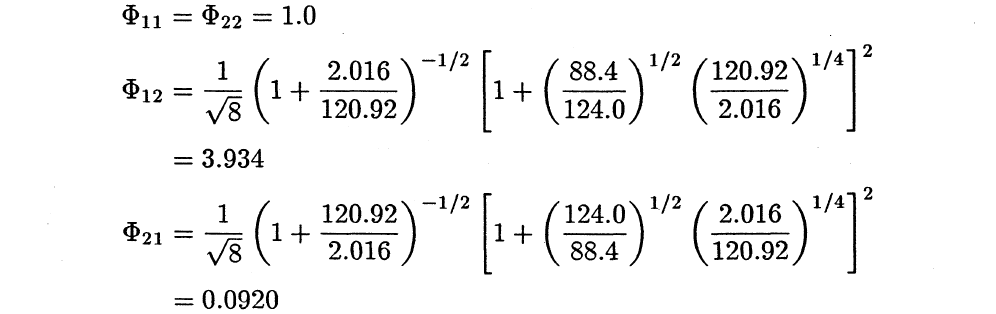


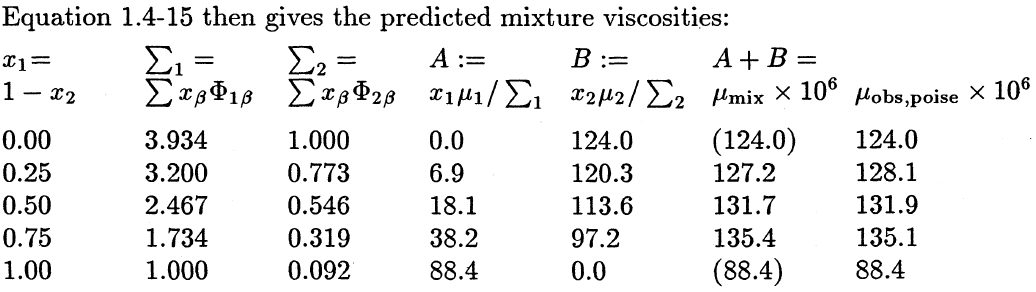




**1A.4 Gas-mixture viscosities at low density.**

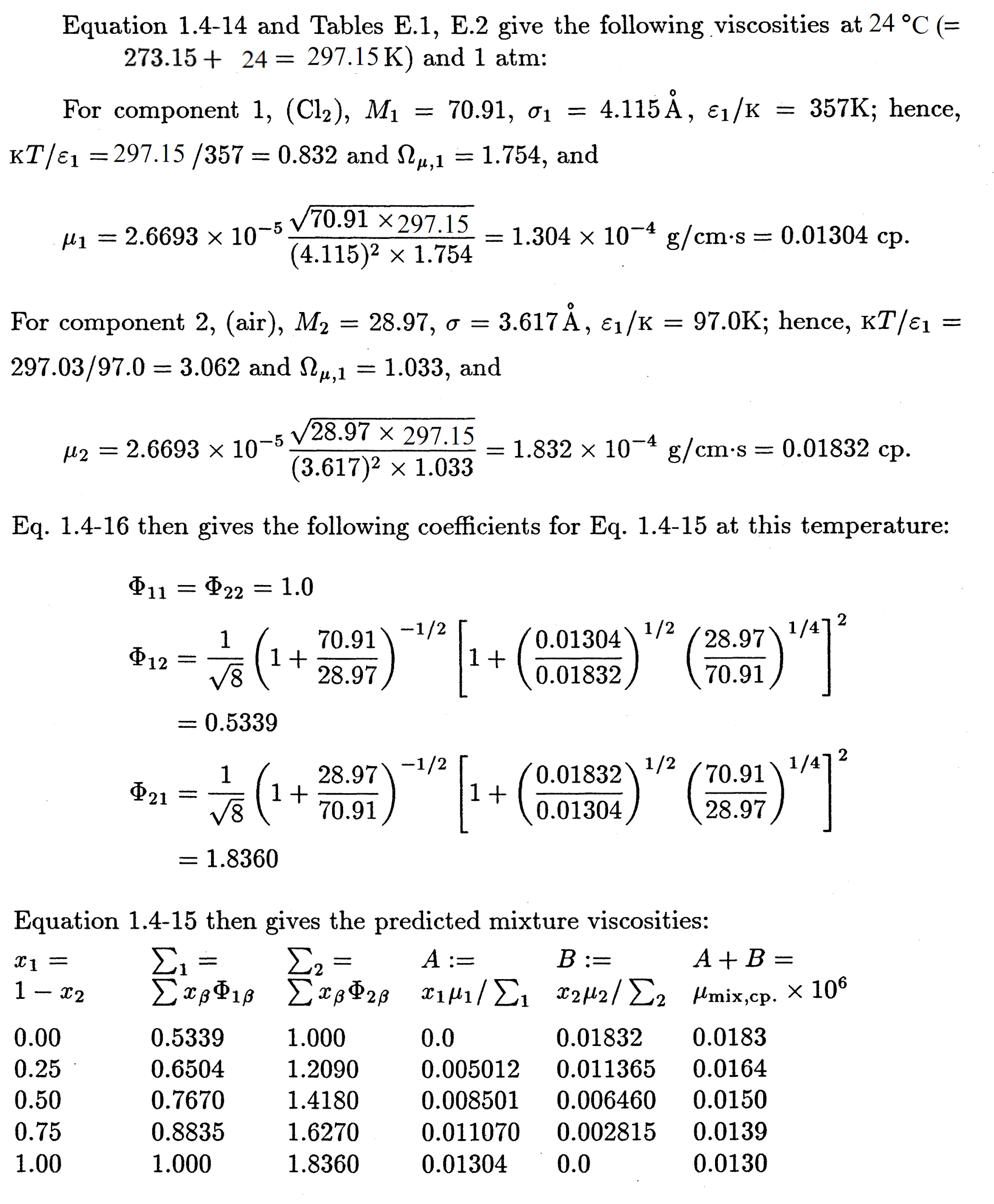


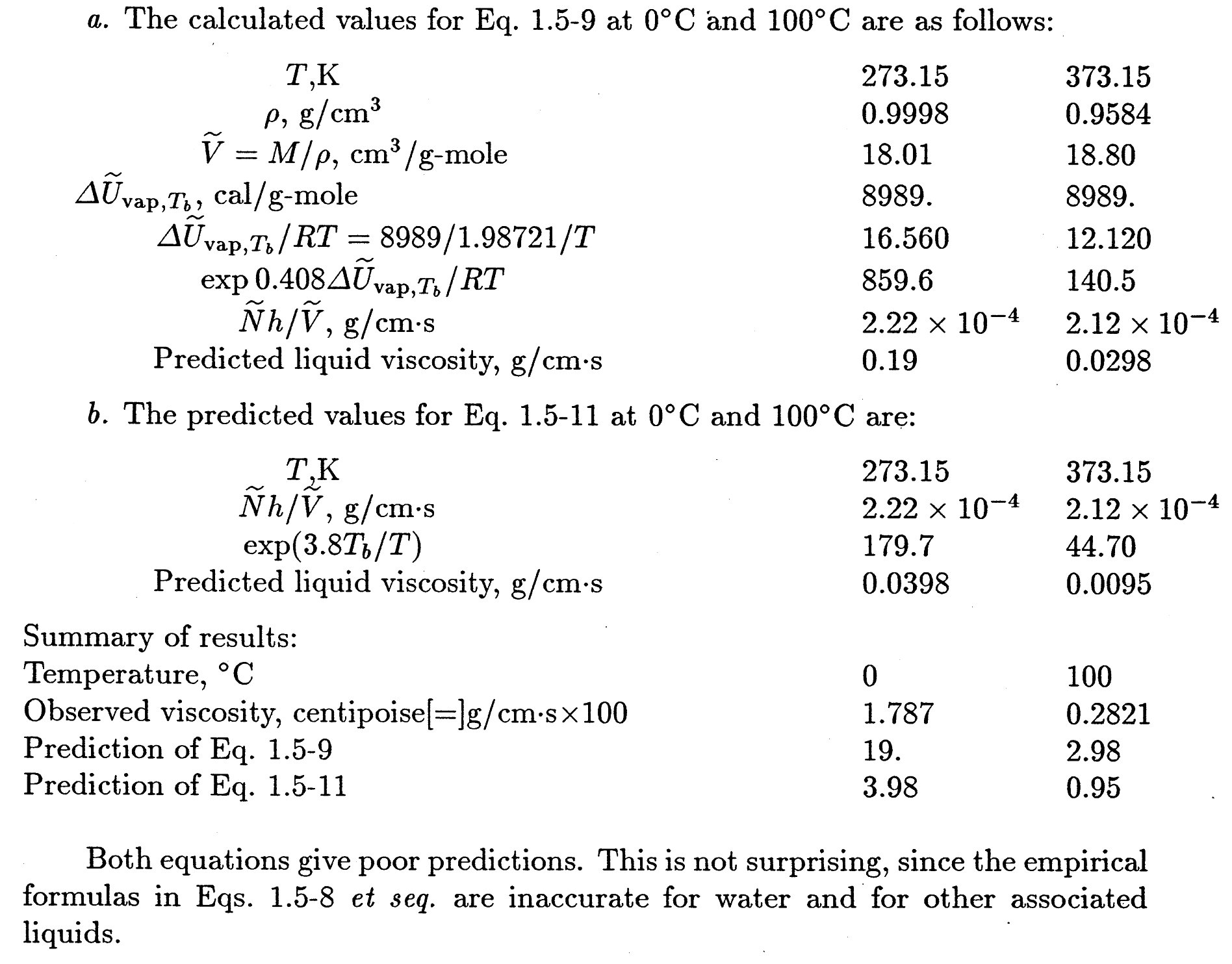
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**1A.5 Viscosities of chlorine–air mixtures at low density.**

Predict the viscosities (in cp) of chlorine–air mixtures at 24°C and 1 atm, for the following mole fractions of chlorine: 0.00, 0.25, 0.50, 0.75, 1.00. Consider air as a single component and use Eqs. 1.4-14 to 16.



**1A.6 Estimation of liquid viscosity.**



**1A.7 Estimation of Momentum flux:**

The velocity is linear so that

The viscosity of glycerol at 25°C from Table 1.1-3 is

Substitution into Eq. 1.1-2 gives

**1A.8 Estimation of liquid viscosity and Momentum flux:**

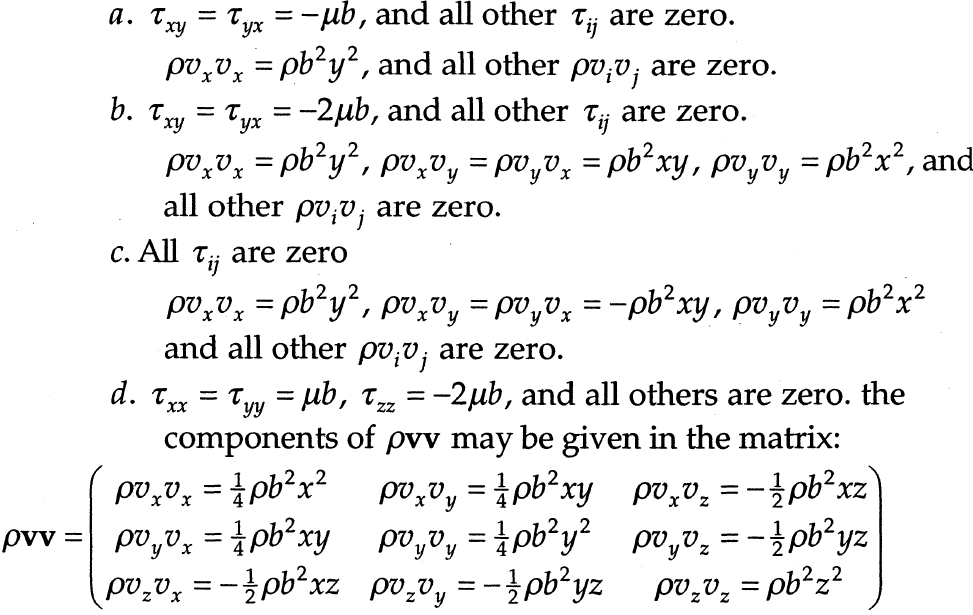
Use Eq. 1.5-11 with the following information

Viscosity is given by:

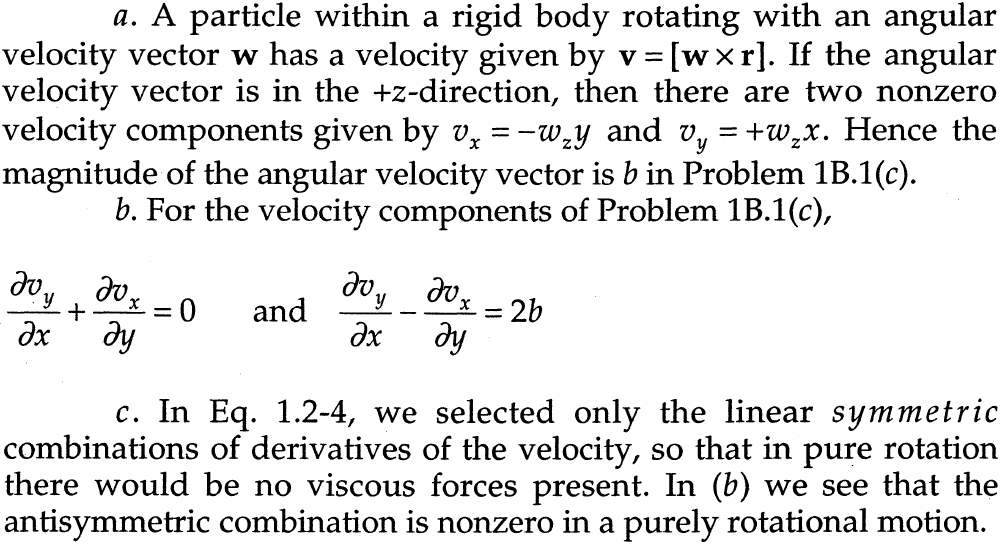
The velocity is linear so that

Substitution into Eq. 1.1-2 gives

**1B.1 Velocity profiles and stress components**

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**1B.2 A fluid in a state of rigid rotation**

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