Question 6.

Given 50ml of liquid nitrogen, what is its volume at room temperature and pressure?

1 atm
300K
1.44 mol

Volume ?

nitrogen

| | |
|---|---|
| $m = \rho V = (0.808\ g/ml)*(50ml) = 40.4\ grams$ | $\rho = 0.808\ g/ml$ |
| $n_{nitrogen} = 40.4/28\ mol = 1.44\ mol$ | $1\ mol\ N_2 = 28\ g$ |

Calculate the volume at 1 atm, 300K

$V = nRT/P = (1.44mol)(0.08206\ atm*L/(mol*K))(300K)/(1atm) = 35\ L$

Volume of air + nitrogen = 2L +35L = 37 L