3 **(a)** Explain why the internal energy of a fixed amount of real gas is NOT solely dependent on its thermodynamic temperature.

……

……

…….. [2]

(b) The pressure of an ideal gas, p, is related to its density, ρ, by the equation $p = \frac{1}{3}\rho\langle c^2 \rangle$

where $\langle c^2 \rangle$ is the mean square speed of the gas molecules.

Using the above equation, show that the internal energy of a fixed amount of ideal gas is directly proportional to its thermodynamic temperature.

[3]

[Total: 5]