

In the name of God

Department of Physics  
Shahid Beheshti University

ADVANCED STATISTICAL MECHANICS I

Exercise Set 9

(Due Date: 1402/10/25)

1. For ideal fermi gas, show that

$$\frac{PV}{Nk_B T} = \sum_{\ell=1}^{\infty} (-1)^{\ell-1} a_{\ell} \left( \frac{\lambda^3}{g_s V/N} \right)^{\ell-1}$$

and

$$C_V = \frac{3}{2} Nk_B \sum_{\ell=1}^{\infty} (-1)^{\ell-1} \frac{5-3\ell}{2} a_{\ell} \left( \frac{\lambda^3}{g_s V/N} \right)^{\ell-1}$$

and compute  $a_{\ell}$ .

2. Derive equations 8.1.37 and 8.1.38  
3. Solve questions no. 8.3, 8.4, 8.7, 8.10, 8.18, 8.23

Good luck, Movahed

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