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Assignment work.

(1) Ans 25 If n is the number of conduction electron per unit volume and m the electron mass then show that the fermi-energy is given by the expression

$$E_f = \frac{h^2}{8m}\left(\frac{3n}{\pi}\right)^{2/3}$$

(2) Ans 26 The probability for occupying the fermi level $P_f = 1/2$. If the probability for occupying a levels ΔE above E_f is P_+ and for a level ΔE below E_f is P_- then show that for $\frac{\Delta E}{kT} << 1$, P_f is the mean of P_+ and P_-.

Ch 9 Ans 25 If the Quantum theory of blackbody radiation Plank assumed that oscillators are allowed to have energy $0, \epsilon, 2\epsilon \ldots$ show that mean energy of the oscillator is $\bar{\epsilon} = \frac{\epsilon}{[\exp(\epsilon/kT) - 1]}$, $\epsilon = h\nu$