

COLLEGE OF ENGINEERING & TECHNOLOGY

Department: Electronics and Communications Engineering

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Course Title: Solid State Electronics

Course No.: EC210

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Sheet 10



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Question 1:

Derive the expression for the effective density of states for electrons.

Hint:

- The solution of $\int_0^{\infty} x^{\frac{1}{2}} e^{-x} dx = \frac{\sqrt{\pi}}{2}$
- Use the transformation $x = (E - E_c)/K_B T$

Question 2:

Calculate, using the results of Q1, the effective conduction band density of states, N_c for electrons and N_v for holes for Si, assuming $m_n^* = 1.182m_0$, $m_p^* = 0.81m_0$ at $T = 300K$

Question 3:

Example 5.5 p.394.