

Problem Set 3

Physics 221

Due October 22

Some abbreviations: B - Boas.

1. B. p.142 #17 & #18 & #23 & #25
2. B. p.159 #9 & #10 & #11 & #12 & #26 & #33
3. B. p.160 #41 & #58
4. Use the bra-ket notation we introduced in lecture. Show that for a Hermitian operator H , any two eigenvectors $|v_1\rangle$ and $|v_2\rangle$ satisfying

$$H|v_1\rangle = \lambda_1|v_1\rangle, \quad H|v_2\rangle = \lambda_2|v_2\rangle$$

obey the relation

$$(\lambda_1 - \lambda_2) \langle v_1 | v_2 \rangle = 0.$$

5. Write down the most general 2×2 unitary matrix. Find the eigenvalues of this matrix.