

6/13/12 Final exam

1. Using  $\hbar = c = 1$  units, what are the units (say in meters) of...
2. Relativity and/or light cone question (ch 2).
3. Relativistic electromagnetism question (ch 3).
4. Non-relativistic string lagrangian question (ch 4).
5. Relativistic charged particle lagrangian question (ch 5).
6. Nambu Goto string question (ch 6).
7. Reparameterization symmetry and string EOM question (ch 7).
8. Lorentz generators symmetry question (ch 8).
9. Question about  $X^+$  vs  $X^-$  vs  $X^I$  in light cone gauge (ch 9).
10. Question about the harmonic oscillator creation and annihilation operators.
11. Question about some open string states and their values of  $M^2$  (ch 12).
12. Question about some closed string states and their values of  $M^2$  (ch 13)
13. Question about fermions, what states are allowed (anticommutators and Pauli principle) (ch 14).