(Set-1)

M.Sc.-4th (AP)

Quantum Field Theory

Full Marks : 70

Time : 3 hours

Q. No. 1 is compulsory and answer any **five**
questions from the rest

The figures in the right-hand margin indicate marks

1. Answer *all* the questions :   2 × 10

    (*a*) What are the motivations for formulating
    Dirac equation ?

    (*b*) Discuss the necessity of quantum field theory.

    (*c*) Define energy projection operators and
    discuss their properties.

    (*d*) Show that the current density

    $$j_\mu = -\frac{i}{2}\left(\phi\partial_\mu\phi^* - \phi^*\partial_\mu\phi\right)$$

    satisfies the continuity equation, $\partial^\mu j_\mu = 0$.