# QUIZ – 3, IIT HYDERABAD

**ME5010 – Mathematical Methods for Engineers Date: 10/09/2014**

 **Maximum Marks – 30 Time duration: 1 hours**

 **Instructions:**

1. **Mobile is not allowed in the exam.**
2. **Only calculator is allowed.**
3. a) If a vector is defined over a volume ***V*** enclosed by an area ***A*** which surround by a boundary ***l*** , briefly define

 Stokes theorem, Divergence theorem, and Helmholtz theorem.

b) Evaluate the integral using Stroke’s theorem, where, **u** = and ***S*** is

 the surface for .

1. Answer the following Marks: (
2. For a given functional , find the expression for and .
3. Find the total differentiation and first variation of the following functions

i)

ii)

1. Find the minima of the following function and functional

i)

, where ,