**EEE361**

**ASSIGNMENT**

**SET-9**

1. a. let and calculate the divergence and curl of F1 and F2. Which one can be written as the gradient of a scalar? Find a scalar potential that does the job.

Which one can be written as the curl of a vector? Find a suitable vector potential.

b. Show that can be written both as the gradient of a scalar and as the curl of a vector. Find scalar and vector potentials for this function.

1. The electric and magnetic fields in free space are given below:

Determine the constants Ho and β as if the fields satisfy Maxwell’s Equations. (Show detail calculation)

1. If any Electromagnetic field fails to satisfy Maxwell’s Equation and the wave equation derived from them, then the electromagnetic field is said to be nonexistent or not Maxwellian. Which of the following fields/ Expressions in free space are not Maxwellian? State why the expression/s are not Maxwellian. (Show Calculation)
2. An Electric field in air (Z 0) with the component:

E = 10 sin (⍵t + 3z) ax V/m hits normally in a river surface at z = 0 as shown in fig 1. below. Suppose that the river surface is smooth and the ε = 80ε0, µ = µ0 in river, Find

* + 1. ⍵
    2. The wavelength of the signal in air
    3. The reflected E and H field
    4. The transmitted E and H field

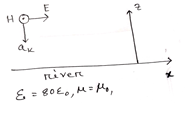


Fig: Problem 4

1. Show that

This expression satisfies the wave equation in a dielectric medium. Find the vector