THE INTERNATINONAL UNIVERSITY (IU) – VIETNAM NATIONAL UNIVERSITY – HCMC

**Final Examination**

**Date:** May 21, 2016

**Duration:** 120 minutes

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| **SUBJECT: Electromagnetic Theory** | |
| Dean of School of Electrical Engineering  Signature:  Full name: Tran Van Su | Lecturer  Signature:  Full name: Tran Van Su |

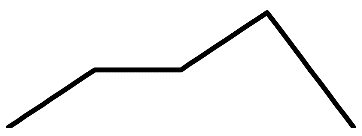
**INTRODUCTIONS:**

1. One sheet, A4-size paper, with your own hand-writing characters is allowed (Books are prohibited)
2. Laptop and communications devices are not allowed except calculators
3. Answer all questions

**Question 1 (20 Marks)**

An infinite plane sheet of current density (A/m), where is as shown in *Figure* below, lie in the z = 0 in free space. Find and sketch:

1. versus t in the z = 600m plane **(10 Marks)**
2. versus z for t = 2µs **(10 Marks)**



0.2

0.1

0 1 2 3 4

JS (A/m)

t (µs)

**Question 2 (15 Marks)**

The electric field of a uniform plane wave propagating in the +z direction in a nonmagnetic

(x10-7) material medium is given by

(V/m)

Find the magnetic field of the wave (*Hint:* )

**Question 3 (10 Marks)**

The plane z = 0 forms the boundary between free space (z > 0) and perfect conductor (z < 0)

1. Find at t = 0 and = cos **(5 Marks)**
2. Find at t = 0 and = cos **(5 Marks)**

**Question 4 (15 Marks)**

The sinusoidally time-varying, linearly polarized vector fields are given at a point by

, ,

Determine the polarizations of the following vectors:

1. **(7 Marks)**
2. **(8 Marks)**

**Question 5 (15 Marks)**

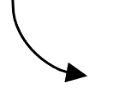
For the Transmission line of the following *Figure*:

1. The reflected wave voltage is 1/5 times the incident wave voltage **(5 Marks)**
2. The transmitted wave voltage is 1/5 times the incident wave voltage **(5 Marks)**
3. The reflected wave voltage is 1/5 times the transmitted wave voltage **(5 Marks)**

**Z01**

**Z02**

**Question 6 (25 Marks)**



Vg = 120 V

Rg = 70 Ω

t = 0

Zo = 50 Ω

vp = 108 m/s

RL = 30 Ω

100m

For the transmission line in *Figure* shown:

1. Sketch the bounce diagram of the voltage and give enough information on it (up to 5µs) **(5 Marks)**
2. Sketch the bounce diagram of the current and give enough information on it (up to 5µs) **(5 Marks)**
3. Determine the voltage at the middle of the line at t = 2.8µs **(5 Marks)**
4. Calculate steady state VSS and ISS **(5 Marks)**
5. Calculate steady state V+SS, V⁻SS, I+SS and I⁻SS **(5 Marks)**