COURSE CODE: PHY 404
COURSE TITLE: ELECTRODYNAMICS III
CREDIT UNIT: 3
TIME ALLOWED: (3 HRS)
INSTRUCTION: *Answer question 1 and any other THREE questions*

QUESTION 1

1(a) Define position vector (3marks)

(b) State Divergence theorem and show its mathematical expression (6mark)

(c) Derive Maxwell's second equation of electrostatics (8marks)

(d) Write four (4) Maxwell's differential form wave equation (8marks)

QUESTION 2

(a) Define Cross product of a vector (3marks)

(b) Graphically, illustrate E&H fields of a particular plane wave at timet. (8marks)

(C) Mention two (2) characteristic of impedance (4marks)

QUESTION 3

(a) Define spherical coordinate system (3marks)

(b) Differentiate between parallel wire transmission lines and coaxial cable transmission lines (6marks)

(c) Discuss two (2) types of line distortion (6marks)

QUESTION 4

(a) A closely wound solenoid 80cmlong has 5 layers of windings of 400turns each. The diameter of the solenoid is 1.8cm. If the current carried is 8.0A, estimate the magnitude of B inside the solenoid near its center. (10marks)

(b) Differentiate between finite and infinite lines (5marks)

QUESTION 5

(a) Define electromagnetic theory (3marks)

(b) Explain the term cyclotron and it's the working principle of cyclotron (6marks)

(c) What are the secondary constant of a line, and why the line parameters called distributed elements (6marks)

QUESTION 6

(a) Define electric flux density (3marks)

(b) State the two (2) laws governing magneto statics fields (8marks)

(c)What is the maximum strength of the B field in an electromagnetic wave that has a maximum electric field strength of 1000v\m (4marks)