TECHNICAL UNIVERSITY OF MOMBASA

A Centre of Excellence

Department of Electrical & Electronic Engineering

TEST1 3rd November 2011 Time: 2 hours

1. (a) A lossless transmission line of characteristic impedance 75 Ω is terminated in a load of $75 + j150\Omega$. If the line is 1m long and the signal frequency is 1 GHz, find the:

(i) Reflection coefficient at the load

(ii) Normalized load admittance

(iii) VSWR

(iv) Input impedance (20 Marks)

2. (a) Consider the transmission line in figure (Qu.1a).Given : Vg = $15V_{RMS}$; Z_0 =75Ω; Zg =75Ω; Z_L = 50 – J100 and the length *l* = λ. Determine:

(v) Reflection coefficient at the load

(vi) Reflection coefficient along the line

(vii) Voltage along the line

(viii) Maximum line voltage

(ix) Minimum line voltage

(x) SWR (20 Marks)

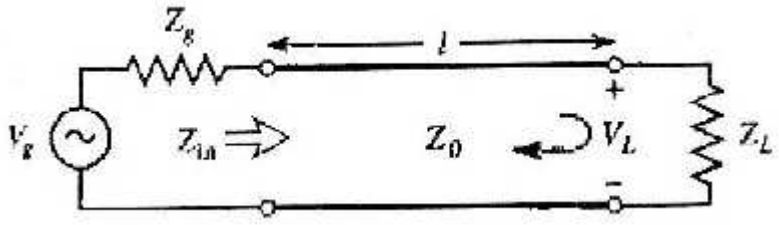

Figure (Qu.1a)

3. Prove mathematically that the input impedance of a short-circuited length of transmission line $\lambda_g/8$ long is equal to $+JZ_o$, while the input impedance of an open-circuited length of transmission line $\lambda_g/8$ long is equal to $- JZ_o$. Check your answers with a Smith chart.

(10 marks)