El-Shorouk Academy	The Higher Institute of Engineering
Computer and control engineering	
Third year 2023	Electromagnetic waves

Sheet Practical on Transmission lines(T.L.)

[1] Which of the following VSWR results are correct and which are wrong: (i)2.5 (ii)3+j0.65 (iii) 0.65 (iv)4.2 (v)-2.3

[2] Which of the following values are true and which are false:
A.Voltage reflection coefficient Γ**:**(i)0.5 (ii)-0.3 (iii)-1.5 (iv)2.1 (v) $0.8\angle 20^o$ (vi)1.2
B. VSWR:(i)3 (ii)1.7 (iii)-3 (iv) $2\angle 20^o$ (v)10

[3] Arrange the following results starting by the best matching to the worst excluding the wrong results
A.Voltage reflection coefficient Γ**:**(i)1.4 (ii)-2 (iii) 0.3 (iv)-0.6 (v)-0.4 (vi) $0.7\angle 30^o$ (vii) $0.5\angle 6^o$ 1.2 (viii)zero.
B. VSWR:(i)2.3 (ii)2.1 (iii)1.3 (iv) –0.5(v)0.75 (vi)10 (vii)1.7 (viii)2.5 +j0.3 (ix) zero

[4]Plot the VSWR for a load impedances: (i) $Z_L = 3Z_O$ (ii) $Z_L = Z_O$(iii) $Z_L = \frac{Z_O}{3}$(iv) short circuit (S.C.). Where Z_O is the characteristic impedance of the transmission line.

[5] Plot the VSWR for a load impedances: (i) $Z_L = 2Z_O$ (ii) $Z_L = 0.5Z_O$ .Where Z_O is the characteristic impedance of the transmission line.

[6] Plot the Standing Wave pattern for the following cases:
(i) High reflection transmission line. (ii) Matched transmission line (reflection free).

[7] Draw the Standing Wave pattern for the following cases:
(i) Short circuit (S.C.) transmission line. (ii) Open circuit (O.C.) transmission line.

[8]Plot the VSWR for a load impedances: (i) $Z_L = 1.5Z_O$ (ii) $Z_L = 0.25Z_O$ .Where Z_O is the characteristic impedance of the transmission line.

[9] Plot the VSWR for a load impedances: (i) $Z_L = 0$ short circuit (S.C.) (ii) $Z_L = Z_O$ matching. (iii) $Z_L = 20\Omega$. If $Z_O = 50\Omega$ is the characteristic impedance of the transmission line.

[10]If the measured VSWR =1.5, calculate the reflection coefficient.

[11] Determine the bandwidth where VSWR is less than 2.3 in figure (1)

[12] For the following measured reflection coefficient by the vector network analyzer (NVA) in the figure (2). Determine the frequency at which the system has the best matching and the frequency of the worst matching. Then, calculate the VSWR at these points.

[13] For the following measured reflection coefficient by the vector network analyzer (NVA) in the figure (3). Determine the frequency at which the system has the best matching and the frequency of the worst matching. Then, calculate the VSWR at these points.

[14] For the following measured reflection coefficient of a transmission in the figure (4). Determine the frequencies at which the system has the line matching are the best and the other frequencies are the worst matching.

Figure (1)

Figure (2)

Figure (3)

Figure (4)