نصف العام

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الثالثة اتصالات

جامعة المنوفية

FACULTY OF ELECTRONIC ENGINEERING, MENOUF
ELECTRONIC AND ELECTRICAL COMMUICATIONS DEPARTMENT

SUBJECT: NETWORK THEORY, 3rd YEAR ***TIME ALLOWED: THREE HOURS***

DATE OF EXAMINATION: Sunday, 29/12/2019 ***TOTAL MARKS: 70 MARKS***

ANSWER THE FOLLOWING QUESTIONS

1. *Find the two Foster realizations of the driving point impedance Z(s) if*

$$|Z(j\omega)|^2 = (\omega^4 + 45\omega^2 + 324)/(\omega^4 + 17\omega^2 + 16)$$ *(14 Marks)*

2. *Synthesize the transfer function $H(s) = V_2(s) / V_1(s)$ of a singly 1-Ω terminated FTN using the two port parameters if*

$$|H(j\omega)|^2 = \omega^6/(\omega^6 + 1)$$ *(8 Marks)*

3.a: *From the first principles determine the element values required for a symmetrical T-section LPF, suitable for insertion in a 600 Ω, if the attenuation, α, at a frequency $f = 2$ MHz, is 22.87819259 dB.*

3.b: *Using the results obtained in (3.a), determine the magnitude of Z_{cT} at $f = 2f_c$ and the phase shift, β, at $f = f_c$.* *(8 Marks)*

4. *If the transfer function is $H(s) = V_2(s) / I_1(s)$, the impedance level is 10^3 Ω and the amplitude function of the Butterworth filter is $|H(j\omega)|^2 = 1/(1+\omega^{2n})$; $n = 1, 2, 3,$ design a 3rd order Butterworth to stop all radient frequencies between 10^4 rad/sec. and $4x10^4$ rad/sec.* *(20 Marks)*

5. *If the transfer function is $H(s) = V_2(s) / V_1(s)$, $\omega_c = 10^4$ rad/sec., $R_o = 1$ Ω and the ripple in the pass-band must not exceed 0.5 dB, synthesize a 3rd order Chebyshev high-pass filter.* *(20 Marks)*

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Dr. Mohamed El-Halawany