Code No. : 5431/N

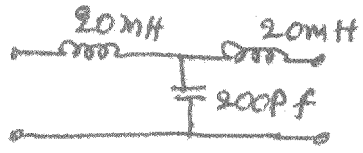
FACULTY OF ENGINEERING
B.E. 2/4 (ECE) II Sem. (New) (Main) Examination, May/June 2012
NETWORKS AND TRANSMISSION LINES

Time : 3 Hours] [Max. Marks : 75

Note : *Answer* ***all*** *questions from Part – **A**. Answer* ***any five*** *questions from Part – **B**.*

PART – A **25 Marks**

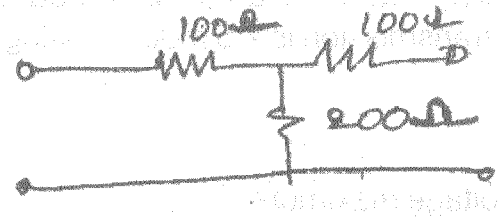
1. Define image impedance and iterative impedance. **2**
2. Explain need of matching networks in detail. **2**
3. What are the advantages of m-derived filters ? How you can choose m = 0.6 for terminating half sections ? **3**
4. Find cut-off frequency of the filter section. **3**



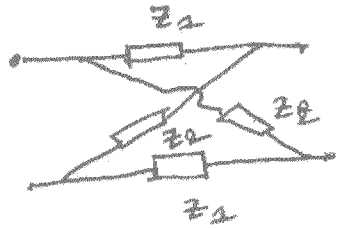
5. What are the applications of equalizers ? **2**
6. What are the inverse networks ? Give examples. **3**
7. List the properties of positive real function. **2**
8. What are the limitations of single stub matching section ? **3**
9. What is the condition for distortion less line ? How this is achieved in practice ? **3**
10. Show that for a filter $z_{OT} \times z_{OTT} = z_1 z_2$ **2**

PART – B **50 Marks**

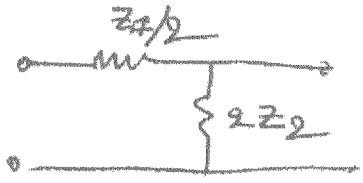
11. a) Find the characteristic impedance and attenuation constant of the network show in Fig. below. **5**



b) Determine characteristic impedance and propagation constant for given lattice network. 5



12. a) Design L-type matching section to match 500 Ω to 400 Ω load. 5
    b) Design A composite T-section 'LPF' with following specifications. $R_0 = 600\ \Omega$, $f_c = 1000$ kHz and $f_\alpha = 1200$ kHz. 5
13. a) Design a unbalanced asymmetrical π-attenuator with a attenuation of 15 dB to operate between 400 Ω and 625 Ω line. 5
    b) Derive the expression for $\cosh\gamma$, where γ is image transfer constant for standard symmetrical π-network. 5
14. a) Synthesize $y(s) = \dfrac{s(s+2)}{(s+1)(s+3)}$. 5
    b) State and explain reactance theorem for LC NW. 5
15. a) Find image impedance z_{i1} and of L-network. 5



    b) Synthesize the function $z(s) = \dfrac{s^2 + 2s + 6}{s + 3}$. 5
16. a) Define phase velocity and group velocity and establish relation between them in detail. 5
    b) Derive an expression for input impedance of A finite length transmission line. 5
17. a) Explain the properties of Smith Chart. 3
    b) A lossless line with $z_0 = 75\ \Omega$ is terminates in an 7 M impedance $Z_R = 115 - j80\ \Omega$. The wavelength of the transmission is 2.5 metres. Using the Smith Chart, find :
    a) Standing wave ratio
    b) Max and Min line impedance
    c) Distance between the load and first voltage maximum. 7