

**Bharati Vidyapeeth's College Of Engineering for Women Pune-43**  
**Department – E & TC**

**Class: TE-II**

**Subject-NSFD**

**Retest I**

**Date: 9/9/10**

**Max Marks:30**

**Instruction: All questions are compulsory**

- Q-1) A) Test whether the polynomial is Hurwitz 7  
i)  $P(s)=s^3+2s^2+3s+6$   
ii)  $F(s)=s^4+s^3+5s^2+3s+4$
- B) Test whether the given function for positive realness 3  
 $F(s)=$
- C) Write a short note on causality and stability of network function. 7
- Q-2) A) State the properties of LC network and synthesize the following by Foster form 7  
 $Y(s)=$
- B) State the properties of network and synthesize the following function by Cauer II form 5  
Draw RL impedance and RC admittance network  
 $F(s)=$

**Bharati Vidyapeeth's College Of Engineering for Women Pune-43**  
**Department – E & TC**  
**TE- Unit Test I**  
**Subject-NSFD**

**Date: 27/08/10**

**Max Marks:30**

**Instruction: All questions are compulsory**

- Q-1) A) Define network function. State the properties of all types of network functions. 4  
B) Explain the poles and zeros on the system function 4  
C) Test whether the polynomial  $s^5+2s^3+s$  is Hurwitz 4  
D) Determine whether the following functions are p.r. 3  
     $F(s)=$
- Q-2)A) State the properties of LC network and synthesize the following network by Foster I Form 6  
     $Z(s)=$
- B) State the properties of RL driving point impedance function and synthesize the  $Z(s)=$  By any one Cauer form

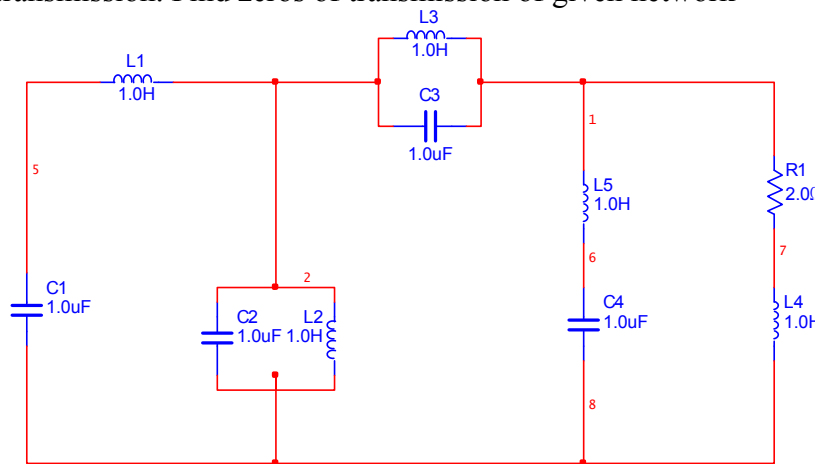
**Bharati Vidyapeeth's College Of Engineering for Women Pune-43**  
**Department – E & TC**  
**TE- Unit Test II**  
**Subject-NSFD**

**Date:28/09/10**

**Max Marks:30**

**Instruction: All questions are compulsory**

- Q -1) A) Synthesize following given function 4  
 $Z_{21}=1/(s^3+3s^2+3s+2)$
- B) Synthesize the following voltage ratio in lattice form 4  
 $V_2/V_1=$
- C) Define zeros of transmission. Find zeros of transmission of given network 7



- Q-2) A) Find the Butterworth approximation for a LPF for given Filter requirements 4  
 $A_{\max}=0.5\text{db}$ ,  $A_{\min}=12\text{db}$ ,  $W_p=100\text{rad/sec}$ ,  $W_s=400\text{ rad/sec}$
- B) Find the Chebyshev approximation for LPF for given filter requirements 4  
 $A_{\max}=0.5\text{db}$ ,  $A_{\min}=20\text{db}$ ,  $W_p=200\text{rad/sec}$ ,  $W_s=600\text{ rad/sec}$
- C) Write short note on following approximation techniques: 7
- I) Butterworth approximation
  - ii) Chebyshev approximation

Table: Chebyshev approximation functions:

$A_{\max}=0.5\text{db}$

N

Numerator of H(s)

Denominator  
Constant K

1	$S+2.86278$	2.86278
2	$S^2+1.42562s+1.51620$	1.43138
3	$(s^2+0.62646s+1.14245)(s+0.62646)$	0.71570
4	$(s^2+0.35071s+1.06352)(s^2+0.8468s+0.356412)$	0.35785
5	$(s^2+0.22393s+1.03578)(s^2+0.48625s+0.47677)(s+0.362323)$	0.17892

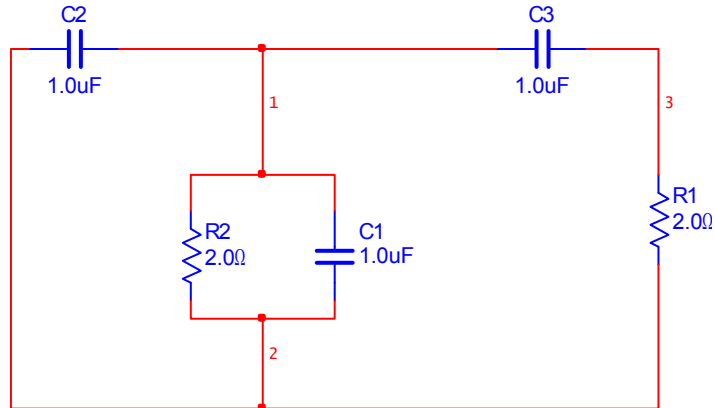
**Bharati Vidyapeeth's College Of Engineering for Women Pune-43**  
**Department – E & TC**  
**TE- Unit Test I**  
**Subject-NSFD**

**Date: 08/08/11**

**Max Marks:30**

**Instruction: All questions are compulsory**

- Q-1) A) Explain the concept and physical significance of poles and zeros. 4  
 B) Obtain voltage ratio transfer function for the network shown 6



- C) What is positive real function. Test whether 6  
 $F(s) = \frac{(s+2)^2}{(s^2+4)}$  is a positive real function

- Q-2) A) State the properties of RC impedance function. Synthesize the following impedance function using both the Cauer forms:

$Z(s) =$  7

- B) Obtain the Foster I and Foster II form of the following impedance function 7

$Z(s) =$

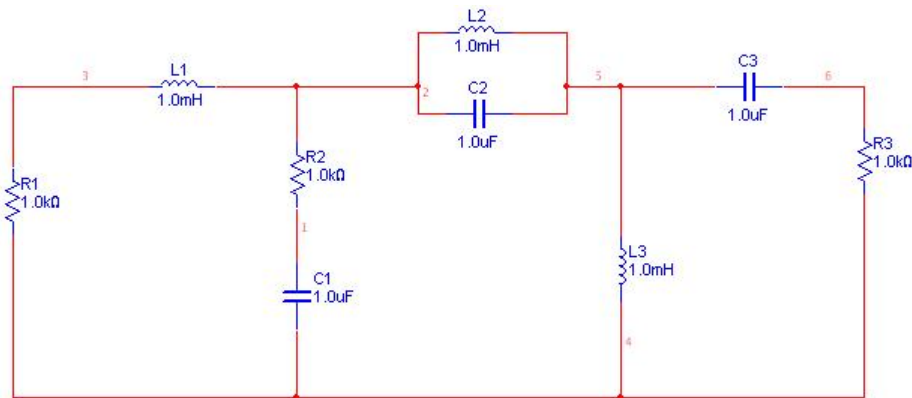
**Bharati Vidyapeeth's College Of Engineering for Women Pune-43**  
**Department – E & TC**  
**TE- Unit Test II**  
**Subject-NSFD**

**Date: 28/9/11**

**Max Marks:30**

**Instruction: All questions are compulsory**

Q-1) A) Explain the significance of zeros of transmission and identify the zeros of transmission of the network below 8



B)  $Y_{21}(s)=$

Synthesize and identify  $z_{ot}$

4

C) Synthesize voltage ratio in terms of two constant resistance bridge-T circuit

4

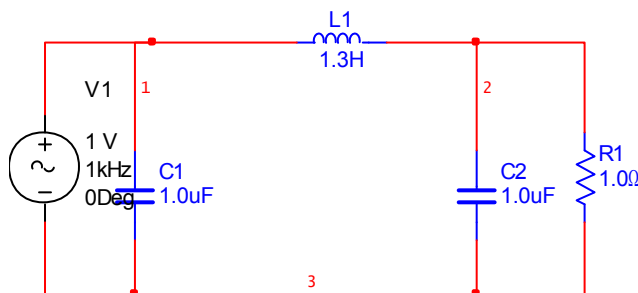
$$V_2/V_1=$$

Q-2) A) State properties of TF. Derive TF of Butterworth Function for 3<sup>rd</sup> order. 6

B) Find the Butterworth approximation for LPF whose requirements are characterized by

$$A_{\max}=0.5\text{db}, A_{\min}=12\text{db}, W_p=100\text{rad/sec}, W_s=400 \text{ rad/sec}$$

C) Convert a LPF shown with



$$R_1=500\Omega \quad w_c=10^6$$

Q-3) a) Explain WITH ONE EXAMPLE co-efficient matching technique for obtaining element values

B) Synthesize following TF with prac component values  $T(s)=20000/(s^2 + 100s + 10000)$

C) Design a second order Sallen – Key LPF with Butterworth approximation

Having  $F_c=1\text{khz}$

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BHARATI VIDYAPEETH'S COLLEGE OF ENGINEERING FOR  
WOMEN,PUNE-43

DEPARTMENT : E&TC

YEAR 2010-11

UNIT TEST I

CLASS:T.E. (DIV-I)

DATE: 27/8/2010

Max. Marks: 30

SUBJECT: NETWORK SYNTHESIS AND FILTER DESIGN

Instructions: All questions are compulsory

- 1] a) Define network function. And state the properties of all types of network functions. [4]
- b) Explain the effect of poles and zeros on the system function [4]
- c) Test whether the polynomial  $S^5 + 2S^3 + S$  is Hurwitz. [4]
- d) Determine whether the following functions is p.r.f. [3]  
 $F(S) = (2S^2 + S + 2) / (S^2 + S + 1)$
- 2] a) State the properties of LC dpZ and Synthesize the following network by Cauer I form.  $Z(S) = (S^2 + 1)(S^2 + 8) / S(S^2 + 4)$  [8]
- b) State the properties of RL dpZ and Synthesize the following network by Foster I form.  $Y(S) = (S + 1)(S + 3) / (S + 2)(S + 4)$  [7]

BHARATI VIDYAPEETH'S COLLEGE OF ENGINEERING FOR  
WOMEN,PUNE-43

DEPARTMENT : E&TC

YEAR 2011-12

UNIT TEST I

CLASS:T.E. (DIV-I)

DATE: 8 / 9 / 2011

Max. Marks: 30

SUBJECT: NETWORK SYNTHESIS AND FILTER DESIGN

Instructions: All questions are compulsory

- 1] a) State the properties of all types of network functions. [4]
- b) State and Explain the conditions for Stability and Causality of a network function [6]
- c) Determine whether the following functions is p.r.f. [6]  
 $F(S) = (S^2 + 6S + 5) / (S^2 + 9S + 14)$
- 2] a) State the properties of LC dpZ function [4]
- b) Synthesize the following impedance function in Foster I and Cauer I form. [10]  
 $Z(S) = (S^2 + 1) / S (S^2 + 4)$



BHARATI VIDYAPEETH'S COLLEGE OF ENGINEERING FOR  
WOMEN,PUNE-43

DEPARTMENT : E&TC

YEAR 2010-11

UNIT TEST II

CLASS:T.E. (DIV-I)

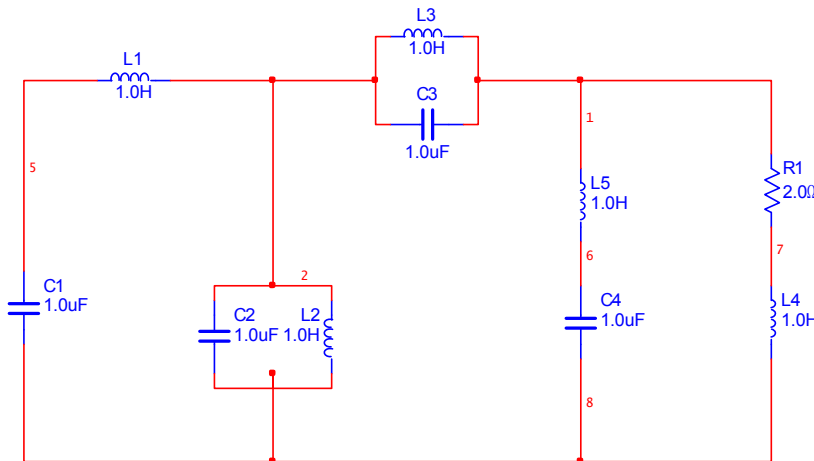
DATE: 28/ 9 /2010

Max. Marks: 30

SUBJECT: NETWORK SYNTHESIS AND FILTER DESIGN

Instructions: All questions are compulsory

- 1] a) Synthesize  $Z_{21} = 1 / (S^3 + 3S^2 + 3S + 2)$  using 1-ohm resistance. [4]  
 b) Synthesize the given voltage ratio in Bridge T network form. [4]  
 $V_2 / V_1 = (S+2) / (S + 3)$   
 c) Define Zeros of Transmissions. Find ZOT of given network. [7]



- 2] a) Find the Butterworth approximation for a LPF for given Filter requirements. [4]  
 $A_{max} = 0.5 \text{ dB}$  ,  $A_{min} = 12 \text{ dB}$  ,  $W_p = 100$  ,  $W_s = 400$
- b) Find the Chebyshev approximation for a LPF for given Filter requirements. [4]  
 $A_{max} = 0.5 \text{ dB}$  ,  $A_{min} = 20 \text{ dB}$  ,  $W_p = 200$  ,  $W_s = 600$
- c) Write a short note on following [7]  
 i) Butterworth approximation ii) Chebyshev approximation



BHARATI VIDYAPEETH'S COLLEGE OF ENGINEERING FOR  
WOMEN,PUNE-43

DEPARTMENT : E&TC

YEAR 2011-12

UNIT TEST II

CLASS:T.E. (DIV-I)

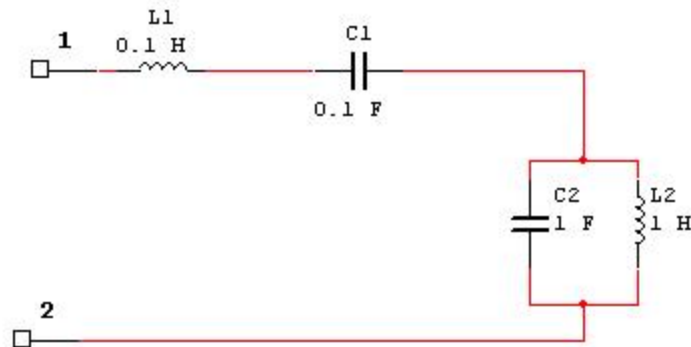
DATE: 26 / 9 /2011

Max. Marks: 50

SUBJECT: NETWORK SYNTHESIS AND FILTER DESIGN

Instructions: All questions are compulsory

- 1] a) Explain the concept of Zeros of Transmissions in network synthesis. Define minimum and maximum phase function. [4]
- b) Identify the ZOT of given network. [4]



- c) Realize the voltage ratio transfer function as a Lattice network with both ends terminated in R [4]
- $$V_2 / V_1 = \left( \frac{1}{2} \right) * [(S-1) / (S+1)]$$
- 2] a) Synthesize given voltage ratio transfer function as a constant resistance bridge T network. [6]
- with both ends terminated in R
- $$V_2 / V_1 = (S^2 + 1) / (S^2 + 2S + 1)$$
- b) Synthesize the open circuit voltage ratio transfer function using RC ladder network. [6]
- with both ends terminated in R
- $$V_2 / V_1 = K / [(S+2) / (S+4)]$$

- 3] a) Compare Butterworth approximation characteristics with Chebyshev approximation . Draw the frequency response for both . Define cut-off frequency. [4]
- b) Find the loss at  $\omega_s=40$  rad/sec for a fifth -order ( $n=5$ ) Butterworth filter that has a maximum loss of 1 dB at the passband edge frequency  $\omega_p=10$  rad/sec. [4]
- c) Derive an expression for the  $n$  (order of filter) of Butterworth approximation. [6]
- 4] a) Find the approximation function for the second-order normalized Butterworth Low pass filter. [6]
- b) Find the Chebyshev approximation for a LPF for given Filter requirements. [6]  
 $A_{max}= 0.5$  dB ,  $A_{min} = 12$  dB,  $\omega_p=100$  ,  $\omega_s=400$