D 70381 (Pages : 3) Name.....

Reg. No.....

THIRD SEMESTER B.TECH. (ENGINEERING) [09 SCHEME] DEGREE EXAMINATION, NOVEMBER 2014

EC 09 303/PTEC 09 302 NETWORK ANALYSIS AND SYNTHESIS

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *the questions.*
Each question carries 2 *marks.*

1. State Nortons theorem.
2. Draw circuit of Passive differentiator.
3. A network function is given as $V(s) = \frac{10s}{(s+3)(s+2)}$. Obtain V (*t*).
4. List out the characteristics of Chebyshev filters.
5. Check whether $Z(s) = \frac{8-s}{s+1}$ is a positive real function.

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*
Each question carries 5 *marks.*

1. Obtain the impulse response of a series RC network.
2. Two coupled coils have K = 0.8, N_1 = 500 turns, N_2 = 1000 turns and mutual flux being 0.9 Wb. Find primary coil flux. If primary current is 10 A, find primary coil inductance and secondary coil inductance.
3. Express Y-parameters in terms of transmission parameters.
4. What are the different types of attenuators ?
5. Design constant K high-pass filter with T-section having a cut-off frequency of 5 kHz and nominal characteristic impedance R_0 = 600 Ω.
6. Explain Strum's theorem.

(4 × 5 = 20 marks)

Turn over

Part C

Answer **one** *question from each module.*

MODULE I

1. Derive the step response of a series RLC circuit. (10 marks)

Or

2. Find voltage V_L in the circuit using superposition theorem for the Figure 1.

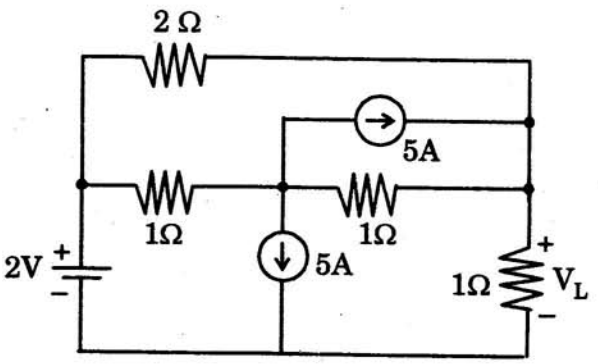


Figure 1

(10 marks)

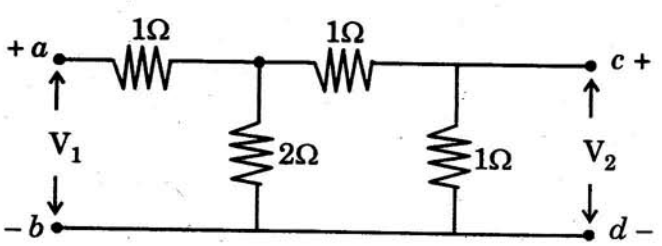
MODULE II

3. For the network function gives by $G(s)=\frac{100}{s(1+0.01s)(1+0.001s)}$ plot asymptotic magnitude response and phase response.

(10 marks)

Or

4. Obtain the transmission parameters of the network shown in Figure 2.



(10 marks)

Figure 2

MODULE III

5. Find the poles of system functions with $n = 3$, $n = 4$ and $n = 5$ Butterworth characteristics. (Do not use tables).

(10 marks)

Or

6. Synthesize a band-pass filter with maximally flat ($n = 4$) amplitude response with $w_{c_2} = 8 \times 10^4$ rad./sec. and $w_{c_1} = 2 \times 10^4$ rad./sec.

(10 marks)

MODULE IV

7. (i) Mention the properties of RC network functions. (5 marks)

(ii) Realize the network impedance function $Z(s) = \frac{(s+1)(s+4)}{s(s+2)}$ using Foster Form I.

(5 marks)

Or

8. Given network admittance function $Y(s) = \frac{(s+2)(s+5)}{s(s+4)(s+6)}$. Synthesize using cauer forms I and II.

(10 marks)

[4 × 10 = 40 marks]