Code No: 183BQ **R22**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech II Year I Semester Examinations, February - 2024
NETWORK ANALYSIS AND SYNTHESIS
(Common to ECE, EIE)

Time: 3 Hours **Max. Marks: 60**

Note: This question paper contains two parts A and B.
i) **Part- A** for 10 marks, ii) **Part - B** for 50 marks.
- Part-A is a compulsory question which consists of ten sub-questions from all units carrying equal marks.
- Part-B consists of **ten questions** (numbered from 2 to 11) **carrying 10 marks each**. From each unit, there are two questions and the student should answer one of them. Hence, the student should answer five questions from Part-B.

PART- A

(10 Marks)

1.a)	What is the purpose of Dot convention?	[1]
b)	What are the characteristics of an ideal transformer?	[1]
c)	Define time constant of R-L series circuit.	[1]
d)	Define band width.	[1]
e)	Define Attenuator.	[1]
f)	What is meant by pole of network function?	[1]
g)	What is meant by band stop filter?	[1]
h)	What is meant by lattice attenuation?	[1]
i)	What are the Properties of Hurwitz Polynomial?	[1]
j)	Test whether F(s)=$\frac{s+3}{s+1}$ is positive real function or not.	[1]

PART - B

(50 Marks)

2.a) Explain about the concept of self-inductance.
b) Two inductively coupled coils have self-inductances of 50mH and 200mH. Find the maximum possible value of mutual inductance between the coils. [5+5]

OR

3.a) Explain about the concept of basic tie-set matrix with an example.
b) An ideal transformer has N_1=10 turns, and N_2=100. What is the value of impedance referred to primary if a 1000 Ω resistor is placed across the secondary? [5+5]

4.a) Derive the expression for step response of a series RL circuit.
b) Determine the quality factor of a coil for the series circuit consisting of R=10**Ω**, L=0.1H and C=10μF. [5+5]

OR

5.a) Explain about the concept of parallel resonance.

b) In the figure 1 given below, the switch is closed at t = 0 Find V_C (t) for t >0. [4+6]

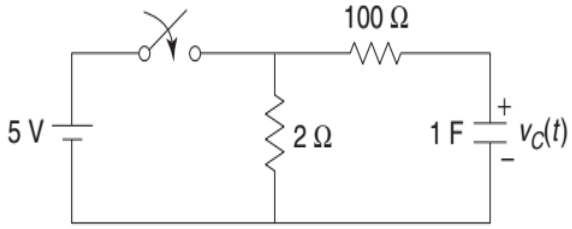

Figure 1

6.a) Explain about g- parameters with its equivalent circuit.

b) Determine the Y-parameters for the network given below figure 2. [4+6]

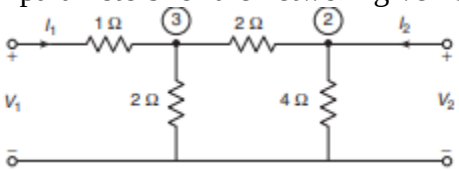

Figure 2

OR

7.a) Explain about hybrid parameters and also draw its equivalent circuit.

b) Determine the driving-point impedance function of a network shown below figure 3. [4+6]

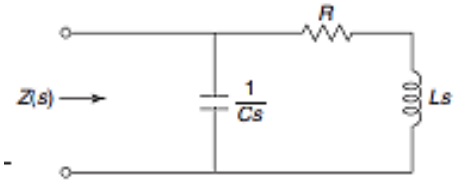

Figure 3

8.a) Classify the different types of filters and discuss them briefly.

b) Design a constant-k high pass filter (T-section) having cut-off frequency of 1KHz with load resistance of 600Ω. [3+7]

OR

9. Design a m-derived high pass filter having cut-off frequency of 10KHz, design impedance of 5Ω and m=0.4. [10]

10.a) List the properties of RL driving point impedance function.

b) Realize the Foster-II form of the impedance function Z(s) = $\frac{(S+1)(S+3)}{S(S+2)}$. [5+5]

OR

11.a) List the properties of LC driving point impedance function.

b) Realize the Cauer-I form of the impedance function Z(s) = $\frac{(S+1)(S+3)}{S(S+2)}$. [5+5]

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