Code No: 133BK **R16**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech II Year I Semester Examinations, February -2024

NETWORK THEORY

(Electrical and Electronics Engineering)

Time: 3 Hours **Max. Marks: 75**

Note: i) Question paper consists of Part A, Part B.
ii) Part A is compulsory, which carries 25 marks. In Part A, answer all questions.
iii) In Part B, Answer any one question from each unit. Each question carries 10 marks and may have a, b as sub questions.

PART – A

(25 Marks)

1.a)	Define graph.	[2]
b)	What is the importance of mutual inductance?	[3]
c)	What are the properties of unbalanced system?	[2]
d)	What is the relation between line and phase voltages in a delta balanced systems?	[3]
e)	What is meant by initial value?	[2]
f)	What is Laplace transform method? State its advantages.	[3]
g)	What is driving point impedance?	[2]
h)	How poles are determined from transfer function? Give an example.	[3]
i)	What is a filter?	[2]
j)	What is the importance of cut of frequency?	[3]

PART – B

(50 Marks)

2.a) Discuss in detail about Faraday's law of electromagnetic induction.
b) What is basic cutset matrix? How to determine it? [5+5]

OR

3.a) Draw a series magnetic circuit and give the detailed analysis.
b) Describe in detail the duality concept applied to electrical networks. [5+5]

4.a) What is the relationship between line and phase voltages in star connected balanced system? Derive.
b) A star connected balanced three phase load is supplied from a three phase 300V supply. The line current is 10A and the power taken by the load is 4 kW. Find the impedance in each branch and the line current [5+5]

OR

5.a) How to measure reactive power in three phase system using two wattmeters? Explain.
b) Three 100 Ω resistors are connected in star across a 400V, 50Hz, 3-ø supply. Find the line current. Determine the value of resistance that must be connected in delta in order to take the same line current. [5+5]

6.a) Determine the transient response in series RL circuit with unit step input.

b) In the circuit below, derive the expression for the voltage 'V' across the inductor. When switch is closed at t=0. Figure 1. [5+5]

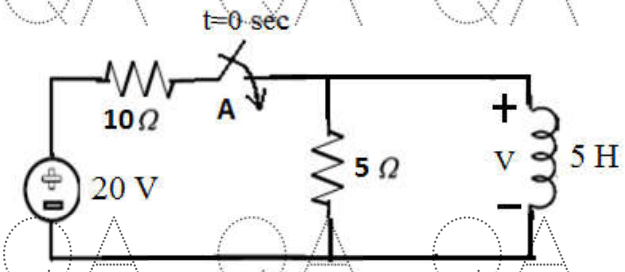

Figure 1

OR

7.a) Determine the transient response in series RC circuit with pulse input.

b) For the circuit given below, V_0=15 V and the inductor is initially relaxed. The switch S is closed at t=0. Derive the expression for 'i' . (Figure 2). [5+5]

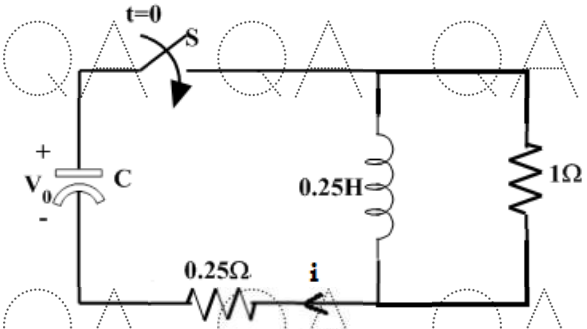

Figure 2

8.a) What are the necessary conditions for transfer function? Explain.

b) Determine the hybrid parameters of the network below. (Figure 3) [5+5]

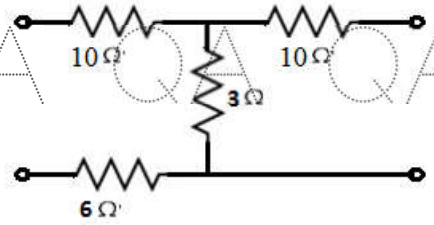

Figure 3

OR

9.a) What is the relationship between Z and Y parameters? Derive.

b) For the circuit below, determine impedance parameters. (Figure 4) [5+5]

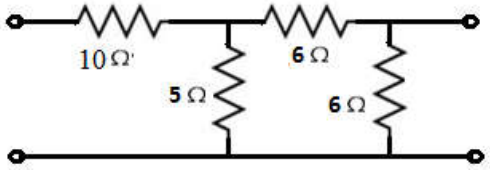

Figure 4

10.a) Draw the low pass filter using R and C. Explain its working.

b) Explain the design of constant K, π section low pass filter. [5+5]

OR

11.a) Draw the high pass filter using R and C. Explain its working

b) What is an m derived filter? How it is different from constant K filters? [5+5]

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