Sub Code: R2321023 **R23** **Set No. 1**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY-GURAJADA VIZINAGARAM
II B. Tech I Semester Regular/Supply Examinations, November – 2025
Electrical Circuit Analysis-II
(EEE)

Time: 3 hours **Max. Marks: 70**

Question paper consists of Part A, Part B.
Part A is compulsory, Answer all questions.
In Part B, Answer any one question from each unit.
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PART-A **(20 M)**

1	a)	Explain when a three – phase system is said to be balanced	[2]
	b)	What is 'floating neutral' in a 3-phase ac system?	[2]
	c)	Define Region of convergence (ROC) of Laplace transform and mention its properties.	[2]
	d)	What do you understand by transient and steady state response? How can they be identified in a general solution?	[2]
	e)	Why are the ABCD parameters termed 'transmission parameters'?	[2]
	f)	How will you find the π -equivalent of a given network when its y-parameters are known?	[2]
	g)	What is the difference between a Fourier series and Fourier integral?	[2]
	h)	Give the exponential form of Fourier series for a periodic function.	[2]
	i)	Distinguish between a passive filter and an active filter.	[2]
	j)	List the limitations of constant k- type filters	[2]

PART-B **(50 M)**

Unit-1

2		Derive the relationship between the phase and line voltages and currents in a 3-phase star-connected circuit. Draw phasor diagrams to establish it.	[10]
		(OR)	
3	a)	With the help of connection and phasor diagrams, explain how the power and power factor of a balanced three-phase load can be determined using the two-wattmeter method.	[5]
	b)	A delta-connected 3-phase load has a resistance of 6 Ω and an inductive reactance of 8 Ω in each branch line. Line voltage is 230 V, 50 Hz. What are the rms values of current and voltage in each branch? Calculate the total power consumed by the circuit and the power factor.	[5]

Unit-2

4	a)	State and explain initial value theorem	[5]
	b)	Find the inverse Laplace transform of the function	[5]

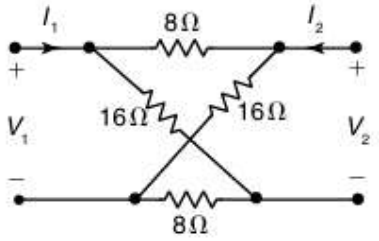
$$F(s)=\frac{2s+1}{(s+1)(s^2+2s+5)}$$

(OR)

5		Determine the current i(t) in a series RLC circuit consisting of R = 5Ω, L = 1 H and C = 0.25 F when the source voltage is given as i) ramp voltage 12r (t - 2), and ii) step voltage 3u (t – 3). Assume that the circuit is initially relaxed.	[10]

Unit-3

6 Find the h-parameters for the network shown [10]



(OR)

7 Derive expressions for the y-parameters in terms of ABCD parameters of a two-port network. [10]

Unit-4

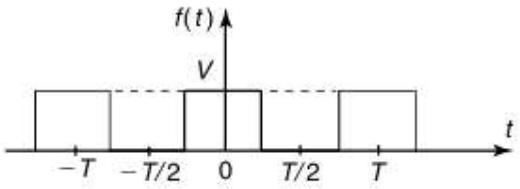
8 a) Show that the Fourier series expansion of a peri odic function with even (mirror) symmetry contains only the cosine terms plus a constant. [5]

b) Find the Fourier transform of the following functions: [5]
i) Constant K ii) Unit step function

(OR)

9 a) Derive an expression for the effective value of a non sinusoidal periodic waveform [5]

b) Find the Fourier series of the function whose periodic waveform is shown below [5]



Unit-5

10 a) Explain the following types of passive filters: [5]
i) Low pass filter and ii) Band pass filter

b) Design a constant K-type High pass filter having a cut-off frequency of 5500 Hz and a design impedance of 750 Ω. Draw T-section filter. [5]

(OR)

11 Explain in detail about constant k – type low pass filter and derive the expressions for impedance and cut – off frequency [10]

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