Code No: R1921021 **R19** SET - 1

II B. Tech I Semester Regular Examinations, March - 2021
ELECTRICAL CIRCUIT ANALYSIS - II
(Electrical and Electronics Engineering)

Time: 3 hours Max. Marks: 75

Answer any **FIVE** Questions each Question from each unit
All Questions carry **Equal** Marks
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1 a) Derive the relation between line and phase quantities in star connected system with necessary diagrams (6M)

b) A balanced delta connection contains an inductor of 1.4 H with a parallel combination of 12-μF capacitor and 64-ohmresistor. If a supply of 400 V at a frequency 360 rad/sec is given to the load, then find, phase current, line current, and the power delivered. (9M)

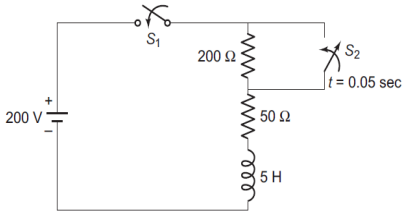
Or

2 a) Explain the effect of power factor on wattmeter readings of power measurement. (6M)

b) If $Z1 = (3 - j7)\ ^{\Omega}$, $Z2 = (5 - j7)\ ^{\Omega}$, $Z3 = (10 + j5)\ ^{\Omega}$ and the supply voltage as 440 V. Find line and phase currents as well as power absorbed when the impedances are connected in delta. (9M)

3 a) Why the voltage drop across the capacitor does not change instantaneously (5M)

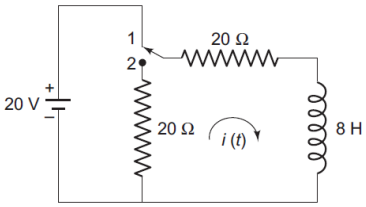
b) In the circuit shown in below Figure, switch S_1 is closed at $t = 0$ and S_2 is opened at $t = 0.05$ sec. Find the transient current using differential equations. (10M)



Or

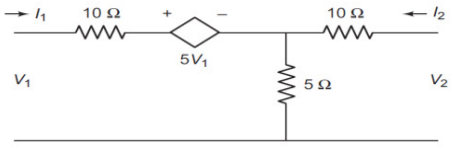
4 a) What are the merits of Laplace transformation to electrical circuits (5M)

b) In the circuit shown in below the switch is moved from 1 to 2 at time $t = 0$. The steady-state current having previously established in the R–L circuit, find the expression for the current $i(t)$ after switching using Laplace transform. (10M)



5 a) Derive the necessary expression for obtaining the open circuit impedance parameters and draw its equivalent representations (6M)

b) Find ABCD parameters of the network shown in below Figure (9M)



Or

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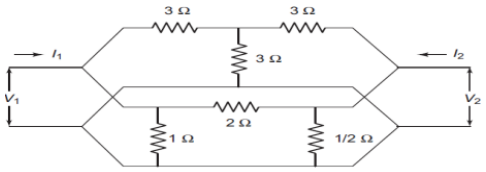
6 a) Obtain the relation between hybrid parameter to impedance parameters (5M)

b) Find the *Y*-parameters of the network shown in below Figure (10M)

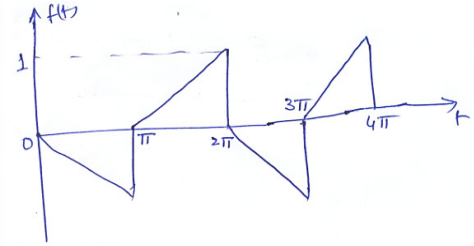


7 a) State and prove the even and odd symmetry (6M)

b) A series RL circuit in which R = 10 ohm and L = 0.05H has an applied voltage v(t) = 100+40 sinω+ 20 sin 3ωt volts. Find $v_o(t)$ and average power. (9M)

Or

8 Find exponential Fourier series of the wave form shown in below figure (15M)



9 a) Explain the physical significance of the Fourier transform (5M)

b) Find the Fourier transform of the following signals (10M)

(i) $F(t) = \delta(t)$ and (ii) $f(t) = e^{-at}u(t)$

Or

10 Find the Fourier transform of $f(t) = e^{-a|t-t_0|}$. Plot the continuous spectrum of amplitude and phase. (15M)

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SET - 2

II B. Tech I Semester Regular Examinations, March - 2021
ELECTRICAL CIRCUIT ANALYSIS - II
(Electrical and Electronics Engineering)

Time: 3 hours Max. Marks: 75

Answer any **FIVE** Questions each Question from each unit
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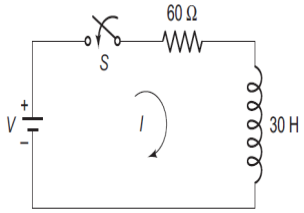
~~~~~~~~~~~~~~~~~~~~~~~~~

1	a)	Derive the relation between line and phase quantities in delta connected system with necessary diagrams	[6M]
	b)	A balanced mesh connected load of (12 + *j*9) ohmper phase is connected to a three phase, 400 V supply. Find (i) line current, (ii) power factor, (iii) power, (iv) reactive volt-amperes and (v) total volt amperes.	[9M]

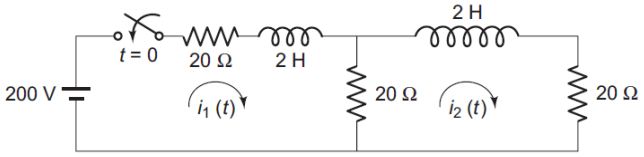
Or

2	a)	Derive the expression for power factor using two-watt meters method.	[6M]
	b)	A 3-phase, 4-wire, 400 V, AC system supplies a star-connected load in which *ZA* = 10 ∠0° ohm, *ZB* =15 ∠30° ohm and *ZC* = 10∠–30° ohm. The phase sequence is *ABC*. Find currents and power absorbed.	[9M]
3	a)	What are the initial conditions? Why are they necessary	[5M]
	b)	A series *R–L* circuit with *R* = 60 ohmand *L* = 30 H has a constant voltage V = 120 V applied at *t* = 0 as shown in below Figure. Determine the current *I*, the voltage across resistor, and the inductor using differential equations.	[10M]

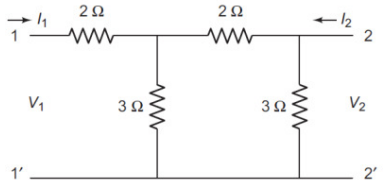


Or

4	a)	Derive the expression for i(t) and capacitor voltage $V_C(t)$ for series RC circuit at t =0. Also explain the time constant of RC circuit	[5M]
	b)	In the network shown in below Figure, the switch is closed at *t* = 0. Find the values of $i_1(t)$ and $i_2(t)$ assuming zero initial currents through inductors using Laplace transforms.	[10M]



5	a)	Derive the necessary expression for obtaining the short circuit admittance parameters and draw its equivalent representations	[5M]
	b)	Find the *Z*-parameters of the network shown in below Figure	[10M]



Or

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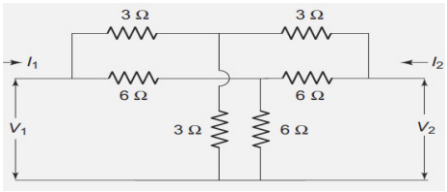
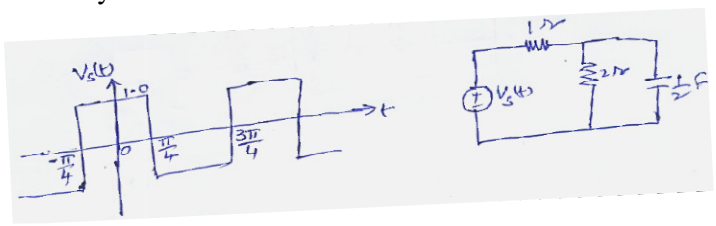
6 a) Obtain the relation between inverse hybrid parameter to impedance parameters [5M]

b) Determine the *Y*-parameters of the two *T*-networks connected in parallel as shown in below Figure [10M]



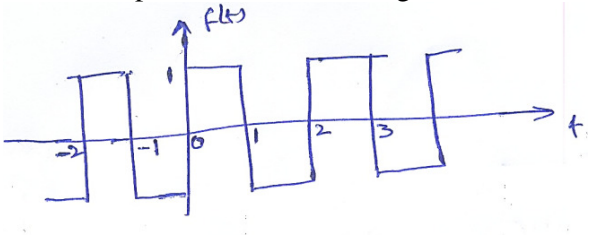
7 a) Derive the expression for exponential Fourier series [5M]

b) If the input voltage $v_s(t)$ is applied to the network shown in fig(b). Find the expression for steady state current. [10M]



Or

8 Find cosine Fourier series representation for the signal shown in the below figure. [15M]



9 The voltage across a 50 ohm resistor is given by [15M]

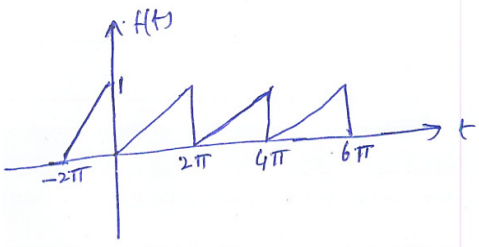
$v(t) = 4t\, e^{-t}$ volts for $t \geq 0$

$= 0$ for $t \leq 0$

Find the percentage of the total energy dissipated in the resistor associated with the frequency band of $0 \leq \omega \leq \sqrt{3}$ rad/sec

Or

10 Find the Fourier transform of the periodic function shown in below figure. [15M]



Code No: R1921021 **R19** SET - 3

II B. Tech I Semester Regular Examinations, March - 2021
ELECTRICAL CIRCUIT ANALYSIS - II
(Electrical and Electronics Engineering)

Time: 3 hours Max. Marks: 75

Answer any **FIVE** Questions each Question from each unit
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1 a) What do you understand by phase sequence and give its significance [6M]

b) A balanced delta connection with load impedance of $(2 + j3)$ per phase is connected to a balanced three-phase 440 V supply. Find active, reactive, and apparent powers if phase current is 10 A. [9M]

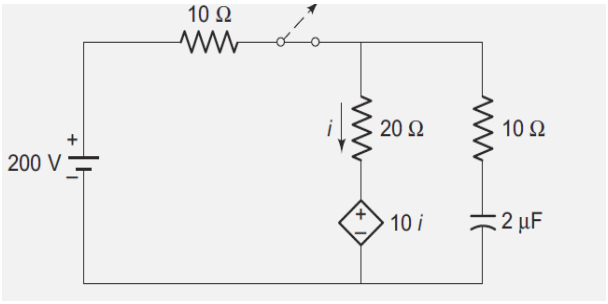
Or

2 a) When the network become unbalance? How it will be solved [5M]

b) A 3-phase, 3-wire star connection having loads $(1 + j2)$ ohm, $(3 + j4)$ ohm, and $(5 + j3)$ ohm and the supply voltage is 440 V. Determine line currents, line voltages, phase currents, and phase voltages. [10M]

3 a) Why cannot the current in a pure inductor change in zero time [5M]

b) For the circuit shown in below Figure, find the current equation when the switch is opened at $t = 0$ using differential equations.

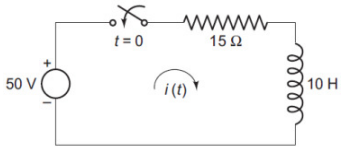


[10M]

Or

4 a) A series RL circuit is supplied by DC voltage. Find the expression for i(t) when the switch is closed at t =0. Draw the characteristics of i(t) v_s t and define the term time constant. [6M]

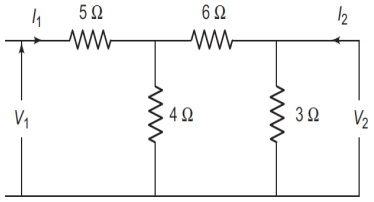
b) Assume zero initial conditions and find $i(t)$ in the circuit using Laplace transforms as shown in below Figure



[9M]

5 a) Explain how do you determine the transmission parameters of a two part network. [5M]

b) Determine *Y*-parameters of the network shown in below Figure



[10M]

Or

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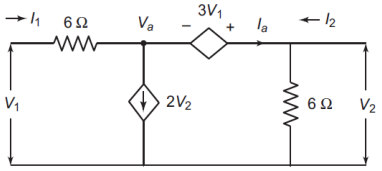
6 a) Obtain the relation between Y and Z parameters [5M]

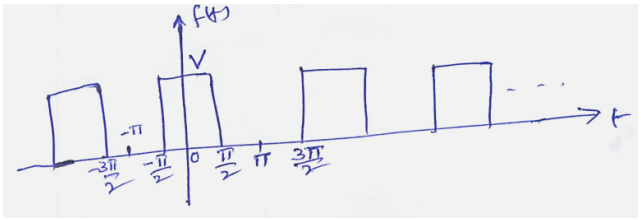
b) Find the transmission parameters of the network shown in below Figure



[10M]

7 a) Derive the expression for evaluation of Fourier coefficients [5M]

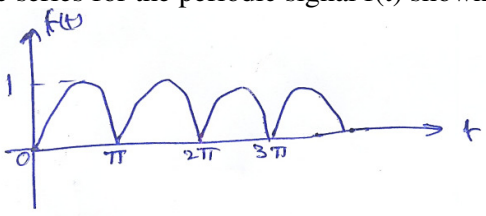
b) Find Cosine representation using Fourier series for the signal shown in below figure



[10M]

Or

8 Find the trigonometric series for the periodic signal f(t) shown in below figure



[15M]

9 State and explain the properties of Fourier transform [15M]

Or

10 Determine the Fourier transform for a signal waveform described by the equation $F(t) = (1+ m \cos \omega_1 t) \cos \omega_0 t$, for all t and sketch the amplitude and phase spectra [15M]

Code No: R1921021 **R19** SET - 4

II B. Tech I Semester Regular Examinations, March - 2021
ELECTRICAL CIRCUIT ANALYSIS - II
(Electrical and Electronics Engineering)

Time: 3 hours Max. Marks: 75

Answer any **FIVE** Questions each Question from each unit
All Questions carry **Equal** Marks
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1 a) What are the merits and demerits of polyphase system over a single-phase system [6M]

b) A three-phase, three-wire, 400 V system supplies a balanced delta-connected load with impedances of $20\angle 45$ ohms. Determine the line current and draw the phase diagram. [9M]

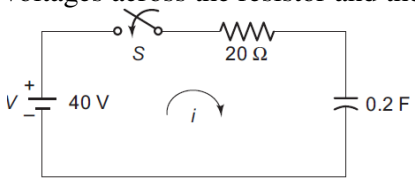
Or

2 a) Explain about the power measurement in a 3-phase circuit using two wattmeter method with neat diagram [7M]

b) A symmetrical 440 V, 3-phase system supplies a star-connected load with the following branch impedances: Z_R = 10 ohm, $Z_Y = j5$ ohm, and $Z_B = -(j6)$ ohm. Calculate voltage drop across each branch. The phase sequence is *RYB*. [8M]

3 a) Explain the importance of time constant of RL circuit. What are the different ways of defining it. [5M]

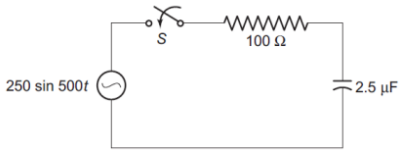
b) A series *R–C* circuit consists of a resistor of 20 ohm and a capacitor of 0.2 F as shown In below Figure. A constant voltage of 40 V is applied to the circuit at t = 0. Obtain the current equationusing differential equations. Also, determine the voltages across the resistor and the capacitor. [10M]



Or

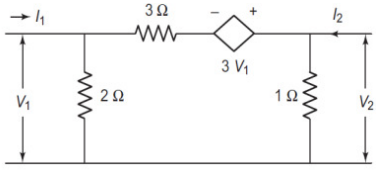
4 a) Distinguish between classical and Laplace transform method of solution of a network [5M]

b) A series *R–C* circuit with R = 100 ohms and C = 2.5 μF as shown in below Figure, has a sinusoidal voltage 250 sin 500t. Find the current using Laplace transforms assuming that there is no initial change on the capacitor. [10M]



5 a) Explain how do you determine the hybrid parameters for a two part network. [5M]

b) Find *Y*-parameters for the network shown in below Figure. [10M]



Or

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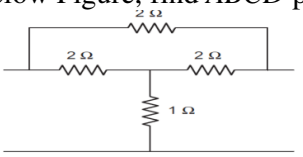
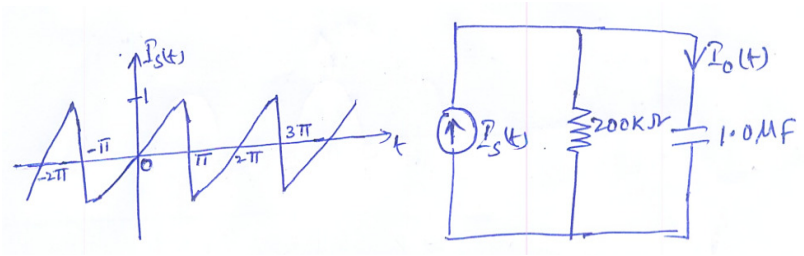
6 a) Express Y-parameters in terms of ABCD parameters [5M]

b) For the network shown in below Figure, find *ABCD* parameters. [10M]



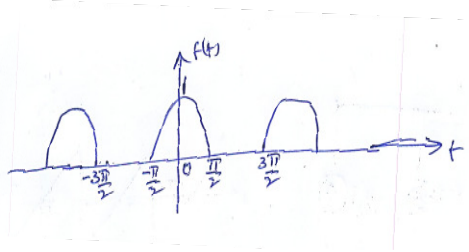
7 a) Obtain the expression for Fourier series in Trigonometric form. [6M]

b) The current source is (t) is applied to the circuit is shown in below figures. Find first four harmonics. [9M]



Or

8 Find the Fourier series for a half wave rectifier sine wave shown in below figure. [15M]



9 a) Explain about the Fourier integrals and Fourier transforms. [9M]

b) What are the specific differences between Fourier and Laplace transforms. [6M]

Or

10 Find the Fourier transform of the function shown in below figure. [15M]