

II B. Tech I Semester Regular Examinations, Dec - 2015
ELECTRICAL CIRCUIT ANALYSIS - II
 (Electrical and Electronics Engineering)

Time: 3 hours

Max. Marks: 70

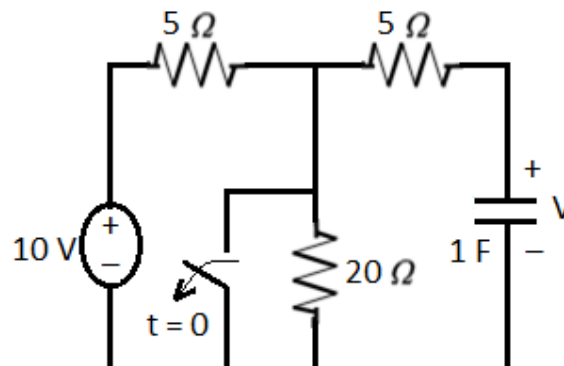
- Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
 2. Answer **ALL** the question in **Part-A**
 3. Answer any **THREE** Questions from **Part-B**
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PART -A

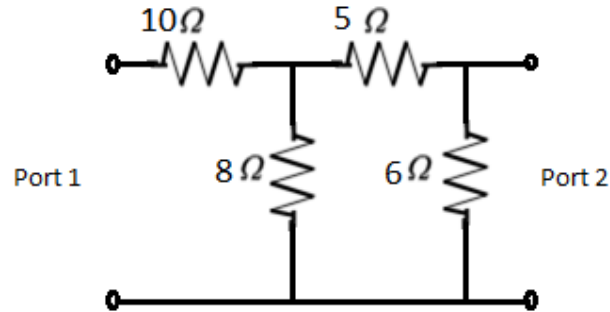
1. a) Define phase sequence and how it is chosen. (3M)
- b) Write short notes on loop method of solving three phase unbalanced circuits. (4M)
- c) Define time constant and write its significance. (3M)
- d) Define symmetrical property in two port networks and write the same for h, z, y parameters. (4M)
- e) Write short notes in LC immittance functions. (4M)
- f) Discuss briefly about Fourier integrals. (4M)

PART -B

2. a) Derive and explain the relationship between line voltage and phase voltage in the three phase balanced star connected system. (8M)
- b) A three phase three wire system has a balanced star connected load with a 50Ω resistance, 100 mH inductance in series with each lien to the neutral point. The circuit is supplied with a balanced supply of 200V , 50 Hz . Determine the line current, total power and the power factor of the load. (8M)
3. a) Derive the relationship for the wattmeter readings in the two wattmeter method of power measurement in the three phase unbalanced star connected system (8M)
- b) A balanced star connected three phase generator with phase voltage 200V supplies an unbalanced star connected load with impedances $(7 + 5j)$, $(4 - 9j)$ and $(8 - 6j)$. Determine the total complex power (8M)
4. a) Derive the relationship for the voltage across the capacitor in the series RC circuit with sinusoidal excitations (8M)
- b) Determine the voltage across the capacitor for the circuit shown in the figure (8M) below



5. a) Derive the condition for the reciprocal property in two port networks in case of impedance parameters. (8M)
b) Determine the admittance parameters for the network shown in the figure below (8M)



6. a) Explain in detail about the Cauer method of network synthesis. (8M)
b) What is RL admittance function? Explain with an example. (8M)
7. a) Explain the exponential form of Fourier series and explain different parameters (6M)
b) Discuss the properties of Fourier transform. (5M)
c) Write a short note on condition of symmetry. (5M)



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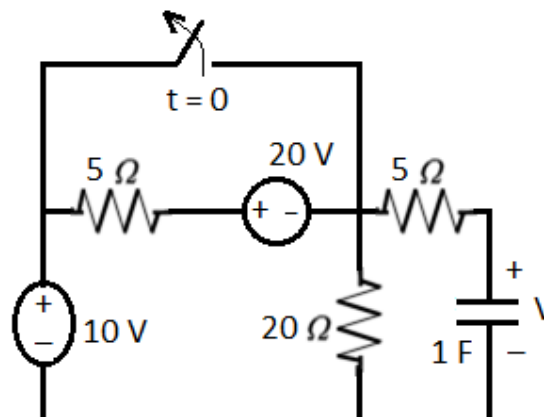
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PART -A

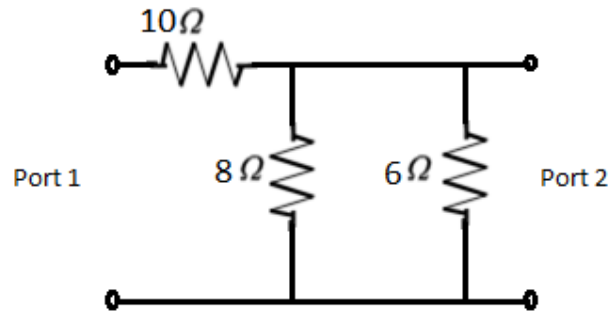
1. a) Write short notes on star connected three phase balanced system (4M)
- b) Write short notes on star delta transformation technique. (4M)
- c) Define steady state and transient responses. (3M)
- d) Write the reciprocal conditions for ABCD, h and Y parameters. (3M)
- e) Write short notes on positive real functions. (4M)
- f) Discuss briefly about phase angle spectra. (4M)

PART -B

2. a) Derive and explain the relationship between line current and phase current in the three phase balanced delta connected system (8M)
- b) A three phase three wire power supply is connected to a three phase star connected load with connecting wires. The load per phase is $(10 + 5j) \Omega$ and the current in the phase is given by $10 \angle 0^\circ$ A. If the source is operating with 0.9 power factor, determine phase voltage and resistance of the connecting wire. (8M)
3. a) Derive the relationship for the wattmeter readings in the two wattmeter method of power measurement in the three phase unbalanced delta connected system (8M)
- b) A delta connected load with phase impedances $(2 + 2j)$, $(4 - 6j)$ and $(2 + 3j)$ are fed by a three phase star connected supply 100 V. Determine the total power delivered to the load. (8M)
4. a) Derive the relationship for the current in the series RL circuit with sinusoidal excitation. (8M)
- b) Determine the voltage across the capacitor for the circuit shown in the figure below (8M)

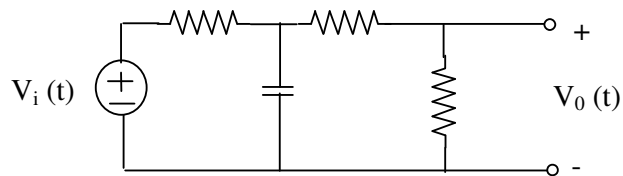


5. a) Derive the condition for the symmetrical property in two port networks in case of hybrid parameters (8M)
 b) Determine the transmission parameters for the network shown in the figure below (8M)



6. a) Explain in detail about different procedures of network synthesis. (8M)
 b) What is RL impedance function? Explain with an example. (8M)
7. a) Explain the trigonometric form of Fourier series and explain different parameters (7M)
 b) Find $V_0(t)$ in the circuit if the input voltage $V_i(t)$ is given as (9M)

$$V_i(t) = \sum_{\substack{n=1 \\ (\text{odd})}}^{\infty} \left[\frac{10}{n\pi} \sin 2nt - \frac{10}{n^2\pi^2} \cos 2nt \right]$$



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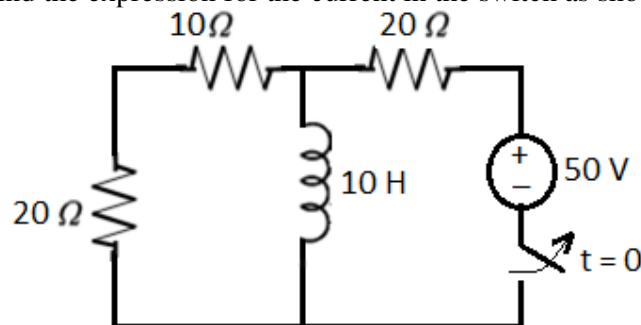
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PART -A

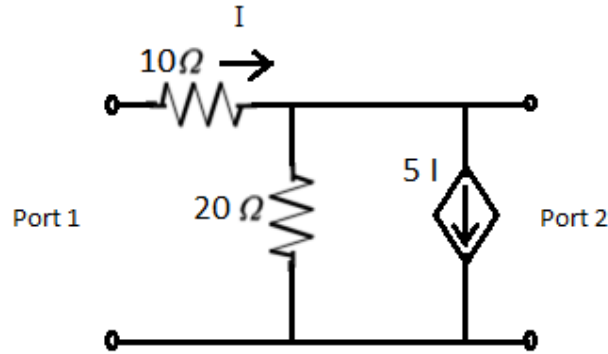
1. a) Write short notes on delta connected three phase balanced system. (3M)
- b) Write short notes on star connected three phase unbalanced system. (3M)
- c) Discuss briefly about initial conditions. (4M)
- d) Express Z-parameters in terms of Y-parameters (4M)
- e) Write short notes on R.L impedance functions (4M)
- f) Discuss briefly about Fourier transform. (4M)

PART -B

2. a) Derive the relationship for the wattmeter readings in the two wattmeter method of power measurement in the three phase balanced star connected system (8M)
- b) A three phase three wire power supply is connected to a three phase star connected load with connecting wires. The load per phase is $(5 + 10j) \Omega$ and resistance of the connecting wire is 0.5Ω . Given the phase voltage is 200V. Determine the line current and the total power delivered to the load (8M)
3. a) Explain in detail about the star delta transformation technique of solving three phase unbalanced circuits (8M)
- b) A three phase four wire star connected balanced supply 100V is connected to a star connected unbalanced load of impedances $(1 + 3j)$, $(8 - 6j)$ and $(1 - 3j)$. Find the current in the neutral wire (8M)
4. a) Derive an expression for voltage across R in an R-L-C series circuit when the circuit is excited with step voltage. (8M)
- b) Find the expression for the current in the switch as shown in the figure below (8M)



5. a) Derive the condition for the reciprocal property in two port networks in case of ABCD parameters (8M)
 b) Determine the impedance parameters for the network shown in the figure below (8M)



6. a) Explain in detail about the Foster method of network synthesis (8M)
 b) What is RC admittance function? Explain with an example (8M)
7. a) Explain different symmetry conditions in the Fourier series (8M)
 b) Determine the effective voltage, effective current and average power supplied to a passive network if the applied voltage in volts is $V(t) = 150 + 80 \sin(15t + 35^\circ) + 40 \sin(45t + 48^\circ)$ and the resulting current in amps is $i(t) = 10 \sin(15t + 55^\circ) + 4 \sin(45t + 78^\circ)$. (8M)



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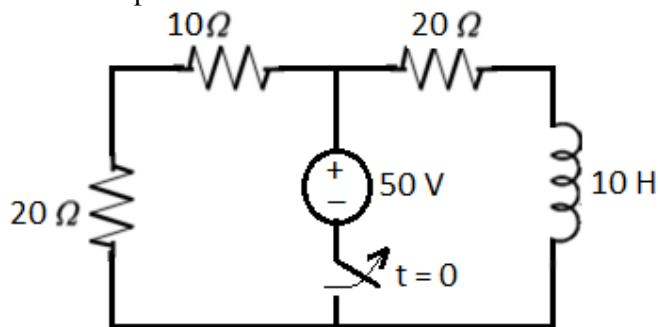
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PART -A

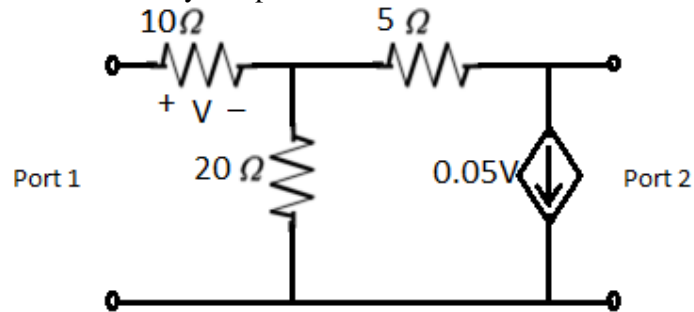
1. a) Draw the circuit diagram that measures the three phase power using two wattmeter method. (4M)
- b) Write short notes on delta connected three phase unbalanced system. (4M)
- c) Draw the time response for the voltage across the capacitor in series RC circuit with DC excitations. (2M)
- d) Why Z-parameters are known as open circuit parameters and Y- parameters are short circuit parameters. (4M)
- e) Write short notes on RC admittance functions. (4M)
- f) Discuss briefly about line spectra. (4M)

PART -B

2. a) Derive the relationship for the wattmeter readings in the two wattmeter method of power measurement in the three phase balanced delta connected system (8M)
- b) A three phase three wire power supply is connected to a three phase star connected load with connecting wires. The load per phase is having a resistance of 10Ω in parallel with $10\mu\text{F}$ capacitor and resistance of the connecting wire is 1Ω . Given the phase voltage is 200V , 50Hz . Determine the line current and the total power delivered to the load (8M)
3. a) Explain in detail about the Loop method of solving three phase unbalanced circuits (8M)
- b) A three phase delta connected balanced supply 200V is connected to a star connected unbalanced load of impedances $(2 + 3j)$, $(4 - 6j)$ and $(2 - 5j)$. Find the line currents (8M)
4. a) Derive an expression for current in the series RL transient circuit with DC Excitations (8M)
- b) Find the expression for the current in the inductor as shown in the circuit below (8M)



5. a) Derive the condition for the symmetrical property in two port networks in case of admittance parameters (8M)
 b) Determine the hybrid parameters for the network shown in the figure below (8M)



6. a) Explain in detail about the Network synthesis procedure. (8M)
 b) What is LC immittance function? Explain with an example (8M)
7. a) Explain the properties of Fourier transforms. (7M)
 b) The input voltage in volts to a series R-L circuit is $e(t) = 180 \sin(314t + 10^\circ) + 56 \sin(942t + 35^\circ) + 18$. The values of R and L are 18Ω and 0.0413H . Determine (i) Expression for current (ii) the rms value of voltage and current (iii) the power factor of the circuit. (9M)

