

Please check that this question paper contains 09 questions and 02 printed pages within first ten minutes.

[Total No. of Questions: 09]

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[Total No. of Pages: 02]

Uni. Roll No.

02 JAN 2023

Program: B.Tech. (Batch 2018 onward)

Semester: 3rd

Name of Subject: Electrical Circuit Analysis

Subject Code: PCEE-101

Paper ID: 16064

Scientific calculator is Allowed

Time Allowed: 03 Hours

Max. Marks: 60

NOTE:

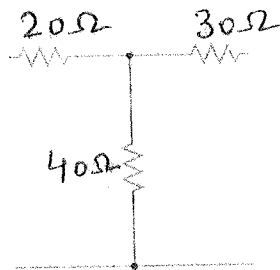
- 1) Parts A and B are compulsory
- 2) Part-C has Two Questions Q8 and Q9. Both are compulsory, but with internal choice
- 3) Any missing data may be assumed appropriately

Part – A

[Marks: 02 each]

Q1.

- a) Write the steps to apply superposition principle.
- b) What is duality? List out the dual pairs.
- c) Give the importance of time constants in network analysis.
- d) Discuss about complex power in brief.
- e) Find the Laplace transform of functions:
(a) $tu(t)$ (b) $e^{at}u(t)$
- f) Determine the z-parameters of the circuit:



Part – B

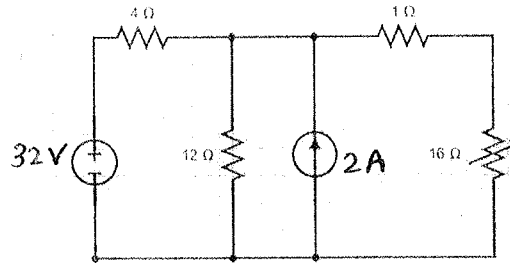
[Marks: 04 each]

- Q2. Discuss about two port networks by mentioning various parameters in terms of equations.

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- Q3. Give the solution of second order differential equation for series R-L circuit.
- Q4. What do you understand by mutual coupled circuit? Explain about Dot Convention in coupled circuits.
- Q5. Find the Thevenin equivalent of the circuit across 16Ω resistance and then find the current through it.



- Q6. A series connected load draws a current $i(t) = 4\cos(100\pi t + 10^\circ)$ A. When the applied voltage is $v(t) = 120\cos(100\pi t - 20^\circ)$ V. Find the apparent Power and the power factor of the load. Determine the element values that form the series connected load.
- Q7. The output of a linear system is $y(t) = 10e^{-t} \cos 4tu(t)$ when the input is $x(t) = e^{-t} u(t)$. Find the transfer function of the system and its impulse response.

Part – C

[Marks: 12 each]

- Q8. Discuss the role of Two port Network parameters in transmission line and ideal transformer. Also compute symmetrical relationship of all parameters with respect to each other.

OR

Describe the importance of Laplace initial and final value theorems in electrical circuit elements. Also discuss about poles and zeros with appropriate diagram.

- Q9. Analyse the performance of source free RLC circuit while discussing the underdamped, critical and overdamped cases.

OR

State and prove the maximum power transfer theorem for AC circuits with the help of an example.
