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Question Paper Code: 33403

B.E. / B.Tech. DEGREE EXAMINATION, DEC 2020

Third Semester

Electronics and Communication Engineering

01UEC303 - CIRCUIT THEORY

(Regulation 2013)

Duration: 1.15 hrs

Maximum: 30 Marks

PART A - (6 x 1 = 6 Marks)

(Answer any six of the following questions)

- The number of independent loops for a network with n nodes and b branches is
 - $n-1$
 - $b-n$
 - $b-n+1$
 - independent for the number of nodes
- Mesh analysis makes use of the basic equation
 - $[V] = [Z] [I]$
 - $[I] = [Z] [V]$
 - $[V] = [Y] [I]$
 - $[I] = [Y] [V]$
- Superposition theorem is not applicable to networks containing
 - nonlinear elements
 - dependent voltage source
 - dependent current source
 - transformers
- Maximum power gets transferred to the load when the load impedance is
 - equal to zero
 - equal to one
 - equal to source impedance
 - none of the above
- What is the Q (Quality factor) of a series circuit that resonates at 6 kHz , has equal reactance of 4 kilo-ohms each, and a resistor value of 50 ohms ?
 - 0.001
 - 50
 - 80
 - 4.0

6. The Q-factor in a series R-LC circuit at resonance is

- (a) $\frac{1}{R} \sqrt{\frac{C}{L}}$ (b) $\frac{1}{L} \sqrt{\frac{C}{R}}$ (c) $\frac{1}{R} \sqrt{\frac{L}{C}}$ (d) $\frac{1}{R^2} \sqrt{\frac{C}{L}}$

7. Self-inductance of a magnetic coil is proportional to

- (a) N (b) $1/N$ (c) N^2 (d) $1/N^2$

8. In two wattmeter method of power measurement, when the power factor of load is zero leading or lagging the two wattmeter will give _____ reading.

- (a) Zero (b) equal
(c) equal and opposite (d) not equal

9. Which parameters are widely used in transmission line theory?

- (a) Z parameters (b) Y parameters
(c) ABCD parameters (d) h parameters

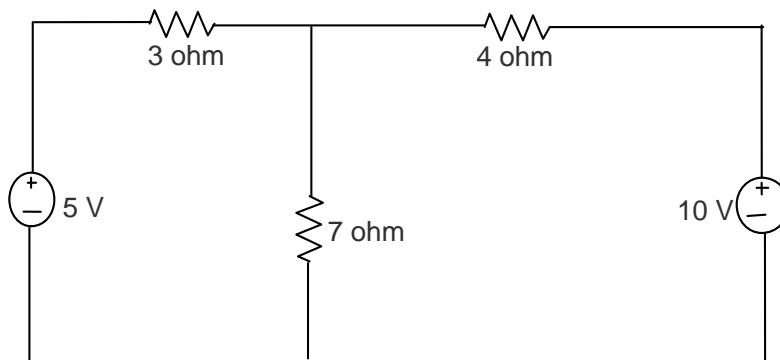
10. The number of possible combinations generated by four variables taken two at a time in a two port network is

- (a) Four (b) Two (c) Six (d) Zero

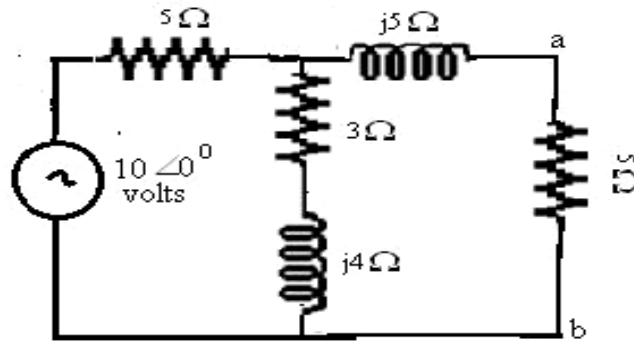
PART – B (3 x 8= 24 Marks)

(Answer any three of the following questions)

11. Draw the dual network of the given circuit. (8)



12. State the Thevenin's theorem and find the current through branch a-b of the network shown in below figure. (8)



13. A voltage $v(t) = 10 \sin \omega t$ is applied to a series RLC circuit. At the resonant frequency of the circuit, the maximum voltage across the capacitor is found to be 500V. Moreover the bandwidth is known to be 400 rad/sec and the impedance at resonance is 100Ω. Find the resonant frequency. Also find the values of L and C of the circuit. (8)
14. Explain the single tuned circuit with neat diagram and obtain the gain and mutual inductance. (8)
15. Convert the given T-network to a Π network. (8)

