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Question Paper Code: 43504

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

Third Semester

Electronics and Instrumentation Engineering

14UEI304 - ELECTRICAL CIRCUITS AND NETWORKS

(Common to Instrumentation and Control Engineering)

(Regulation 2014)

Duration: One hour

Maximum: 30 Marks

PART A - (6 x 1 = 6 Marks)

(Answer any six of the following questions)

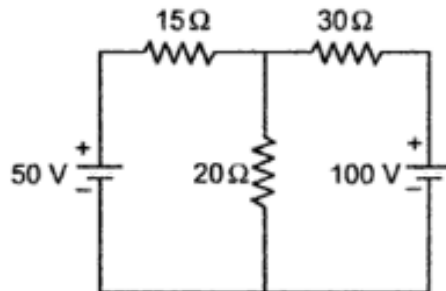
- Ohm's law is not applicable to
 - DC circuits
 - high currents
 - small resistors
 - Semi-conductors
- A circuit contains two un-equal resistances in parallel
 - current is same in both
 - large current flows in larger resistor
 - potential difference across each is same
 - smaller resistance has smaller conductance
- Thevenin resistance R_{th} is found
 - By removing voltage source along with their internal resistance
 - By short-circuiting the given two terminals
 - Between any two open terminals
 - Between same open terminals
- If the source impedance is purely resistive R_g and load impedance consists of variable R_L and fixed reactance X , then, for maximum transfer
 - $R_L = R_g$
 - $R_L = R_g^2 + X^2$
 - $R_L = X$
 - $R_L = X^2$

5. For occurrence of resonance which of the following elements are required?
 (a) R (b) L (c) C (d) both (ii) and (iii)
6. If the bandwidth of a filter increases
 (a) Q increases (b) The roll-off rate increases
 (c) The half power frequency decreases (d) The center frequency decreases
7. By which of the following elements transients will not occur
 (a) R (b) L (c) C (d) all the above
8. With some initial charge at $t = 0+$, a capacitor will act as
 (a) Short circuit (b) Open circuit
 (c) A voltage source (d) A current source
9. In a three-phase system, the volt ampere rating is given by
 (a) $3V_L I_L$ (b) $\sqrt{3}V_L I_L$ (c) $V_L I_L$ (d) $3\sqrt{3}V_L I_L$
10. Wattmeter deflection in ac circuit is proportional to
 (a) average power in the circuit (b) maximum power in the circuit
 (c) instantaneous power in the circuit (d) mean power in the circuit

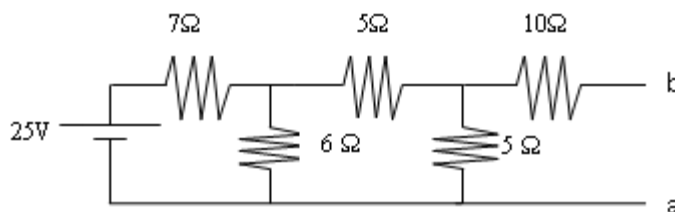
PART – B (3 x 8= 24 Marks)

(Answer any three of the following questions)

11. Apply Kirchhoff's current law and voltage law to the circuit given below. Indicate the various branch currents. Write down the equations relating the various branch currents. Solve these equations to find the values of these currents. (8)



12. Find the thevenin's voltage and thevenin's resistance for the circuit shown in the figure. (8)



13. Derive the formula for mutual inductance in terms of coefficient of coupling and self inductance. (8)
14. A Series RLC circuits has $R=50$ ohm, $L= 0.2H$, and $C = 50$ microfarad. Constant voltage of $100V$ is impressed upon the circuit at $t=0$. Find the expression for the transient current assuming initially relaxed conditions. (8)
15. With a neat circuit and phasor diagram explain the three phase power measurement by two wattmeter method and also derive the expression for power factor. (8)