

B.E/B.TECH DEGREE EXAMINATION, December 2020
 Second Semester
EE18201- ELECTRIC CIRCUIT ANALYSIS
 (Regulation 2018)

Time: Three hours

Maximum : 80 Marks

Answer ALL questions

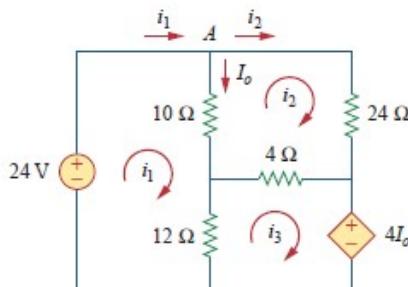
PART A - (8 X 2 = 16 marks)

1. Kirchhoff's law is applicable to
 - (i) Passive networks only (ii)ac circuits only (iii) d.c circuits only (iv) both a.c and d.c circuits
2. The superposition theorem requires as many circuits to be solved as
 - (i)sources, nodes and meshes (ii) sources (iii) meshes (iv) nodes
3. In series RLC circuit that is operating above the resonant frequency, the current
 - (i)lags the applied voltage (ii) leads the applied voltage
 - (iii) is in phase with applied voltage (iv) is zero
4. In a Y-connected circuit, the magnitude of each line current is
 - (i) Zero (ii) One-third the phase current (iii)Three times the corresponding phase current
 - (iv) Equal to the corresponding phase current
5. Given a sinusoid $30 \sin(4\pi t - 60^\circ)$, calculate its amplitude, phase, angular frequency, period, and frequency.
6. Explain half power frequencies.
7. Draw, compare and relate Thevenin and Norton equivalent circuit.
8. How are positive and negative sequence voltages generated?

PART B - (4 X16 = 64 marks)

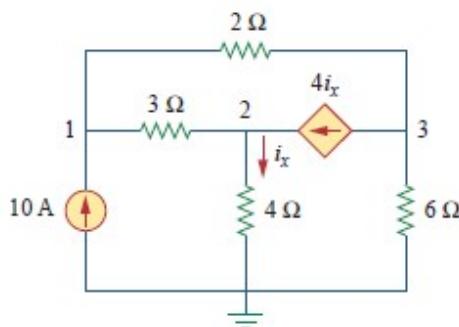
09. (a) Use mesh analysis to determine the current I_o in the circuit.

(16)

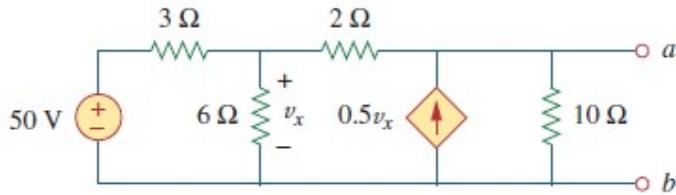
**(OR)**

- (b) Determine the voltages at the three non reference nodes using nodal analysis.

(16)

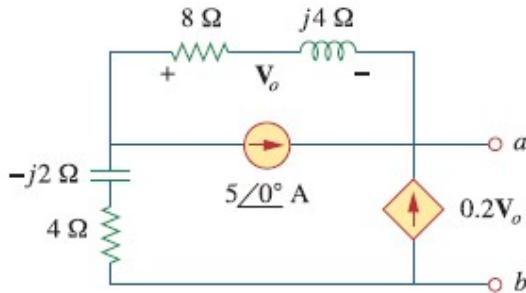


10. (a) Find the Norton equivalent circuit of the circuit below to the left of the terminals (16)
a-b.



(OR)

- (b) Find the Thevenin equivalent circuit of the circuit below as seen from the terminals (16)
a-b.



11. (a) (i) Find the phase angle between (6)
 $i_1 = -4 \sin(377t + 55^\circ)$ and $i_2 = 5 \cos(377t - 65^\circ)$
 Does i_1 lead or lag i_2 ?
 (ii) Derive the resonant frequency, bandwidth and quality factor for a series RC (10)
 circuit.

(OR)

- (b) A series-connected circuit has $R = 4\Omega$ and $L = 25mH$. (16)
 (a) Calculate the value of C that will produce a quality factor of 50.
 (b) Find ω_1 , ω_2 and B .
 (c) Determine the average power dissipated at ω_0 , ω_1 , and ω_2 .
 Assume, $V_m = 100$ V.

12. (a) A series RC circuit consisting of $R=10\Omega$ and $C=0.1F$ is excited from a voltage (16)
 source of 20V. Obtain the equation for current in the circuit and also voltage across
 the resistor and capacitor.

(OR)

- (b) A series RLC circuit with $R=20\Omega$, $L=0.05H$ and $C=20\mu F$ is excited from a voltage (16)
 source of $V=100V$. Obtain the equation for current in the circuit.