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SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)

B.Tech I Year II Semester Supplementary Examinations February-2022

ELECTRICAL CIRCUITS - I

(Electrical and Electronics Engineering)

Time: 3 hours

Max. Marks: 60

PART-A

(Answer all the Questions 5 x 2 = 10 Marks)

- | | | | |
|----------|----------|--|-----------|
| 1 | a | State Kirchoff's Laws. | 2M |
| | b | Define R.M.S value of an alternating current | 2M |
| | c | State Norton's theorem. | 2M |
| | d | Define quality factor. | 2M |
| | e | Write Faraday's laws of electromagnetic induction. | 2M |

PART-B

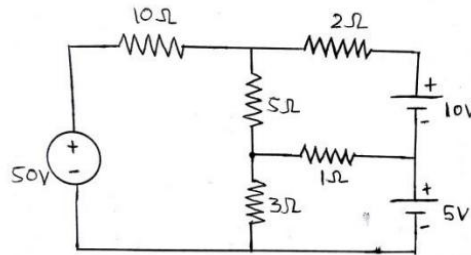
(Answer all Five Units 5 x 10 = 50 Marks)

UNIT-I

- 2** Derive an expression for total resistance when three resistances R_1 , R_2 & R_3 are connected in Series. **10M**

OR

- 3** Find the current passing through each resistor for the circuit below. **10M**



UNIT-II

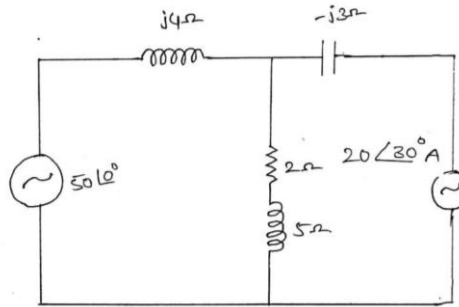
- 4** Find the average value and RMS value of a full wave rectified sine wave. **10M**

OR

- 5** A resistance of 50Ω , inductance of 29.8mH , Capacitance of $3.4\mu\text{F}$ Capacitor are connected in series across a 200V , 250HZ AC Supply. Find **10M**
- Impedance of circuit
 - Current
 - Power consumed in the circuit
 - Power factor
 - Voltage drop across resistance
 - Voltage drop across Inductance
 - Voltage drop across Capacitance. Also, draw the phasor diagram for the circuit.

UNIT-III

- 6 Determine the voltage across $(2 + j5) \Omega$ impedance as shown in figure by using Super position Theorem. **10M**



OR

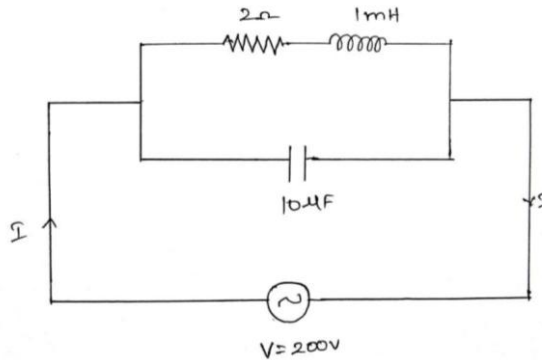
- 7 Derive the condition for the maximum power to be transferred from the source to the load. **10M**

UNIT-IV

- 8 A series RLC circuit has $R=10\Omega$, $L=0.5H$ and $C=40\mu F$. The applied voltage is 100V. **10M**
 Find
 (i) Resonant frequency & Quality factor of a coil
 (ii) Bandwidth
 (iii) Upper and lower Half power frequencies
 (iv) Current at resonance & current at half power points
 (v) Voltage across inductance & voltage across capacitance at resonance.

OR

- 9 In a parallel Resonant, circuit shown in figure, find the Resonant frequency, Dynamic Impedance, Bandwidth, Q-factor and Current at resonance. **10M**



UNIT-V

- 10 A coil of 100 turns is wound uniformly over a insulator ring with a mean circumference of 2m and a uniform sectional area of $0.025cm^2$. If the coil is carrying a current of 2A. **10M**
 Calculate
 (i) the mmf of the circuit
 (ii) magnetic field intensity
 (iii) flux density
 (iv) total flux.

OR

- 11 Derive the expression for equivalent inductance when the coupled inductors are connected in Parallel aiding and parallel opposition **10M**

END