Reg. No:

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech I Year II Semester Supplementary Examinations Dec 2019
ELECTRIC CIRCUITS-I
(EEE)

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 form factor.	2M
	c	State Norton's theorem.	2M
	d	Define resonant frequency.	2M
	e	What are passive and active elements?	2M

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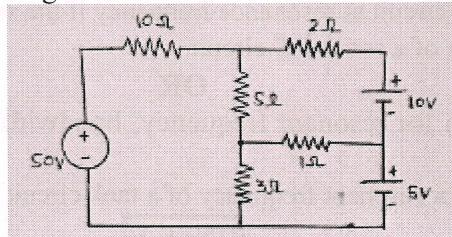(Answer all Five Units 5 x 10 = 50 Marks)

UNIT-I

2   a   Find the equivalent resistance across the terminals A and B of the network shown in   5M
figure using Star delta transformation
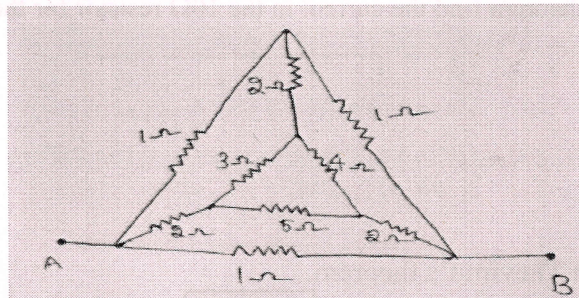
   b   Derive the expression for Delta connected resistances in terms of star connected   5M
resistances.

OR

3   a   Find the current passing through each resistor for the circuit shown in figure   5M

   b   What are the types of sources? Explain them with suitable diagrams and characteristics   5M

UNIT-II

4   a   The full wave rectified sine wave shown in figure has a delay angle of 60°.Calculate the   5M
average value and RMS value.
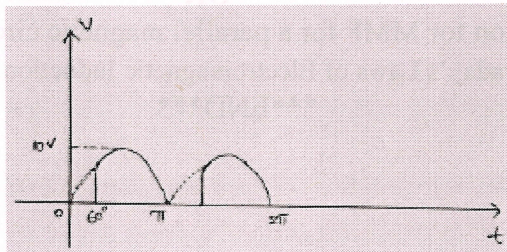
   b   A 1KΩ resistor is connected in series with an inductance of 50mH across a 230V,50Hz AC   5M
supply. Find (a) Inductive reactance (b) Impedance (c) Current (d) Phase angle (e) Voltage
drop resistance (f) Voltage drop across Inductance

OR

5   a   A 50Ω resistor is connected in series with a $25\mu F$ Capacitor across a 230V, 50Hz AC supply. Find capacitive reactance, impedance, Current, Phase angle, voltage drop across Capacitance and power factor.   **5M**

   b   Find the form factor of the half wave rectified sine wave shown in figure   **5M**
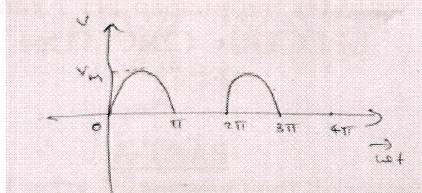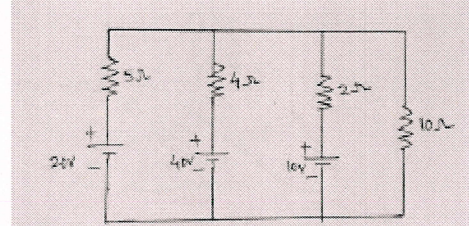

UNIT-III

6   a   Determine the voltage across $(2+j5)\Omega$ impedance as shown in figure by using Superposition theorem.   **5M**
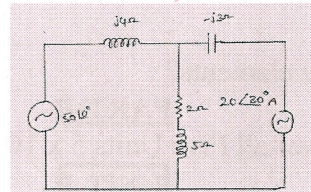
   b   State and explain Reciprocity Theorem.   **5M**

OR

7   a   Using Millman's theorem find the current in the 10Ω resistor for the circuit shown in figure.   **5M**

   b   State and explain Thevinin's theorem.   **5M**

UNIT-IV

8   a   Two coils one of $R_1=0.51\Omega$, $L_1=32mH$ and other coil of $R_2=1.3\Omega$, $L_2=15mH$ are in series and are connected in series with a capacitor of $C_1=25\mu F$, $C_2=62\mu F$ and a resistor of $R_3=0.24\Omega$. Determine Resonant Frequency, Quality factor of the circuit, Bandwidth, and Power dissipated in the circuit at resonance frequency if the supply is 230V AC supply.   **6M**

   b   Draw the locus diagram of a series RC circuit.   **4M**

OR

9   a   Obtain the expression for resonant frequency, bandwidth and Q-factor for series R-L-C circuit.   **5M**

   b   Derive the expression for resonant frequency of a tank circuit.   **5M**

UNIT-V

10   Two coupled coils with $L_1=0.02H$, $L_2=0.01H$ and $K=0.5$ are connected in four ways series aiding, series opposing, parallel aiding and parallel opposing. Determine the equivalent inductances in all the four cases.   **10M**

OR

11   a   Derive the expression for MMF for a parallel magnetic circuit.   **5M**

   b   State and explain Faraday's Laws of Electromagnetic Induction.   **5M**

END