SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.TECH I Year II Semester Supplementary Examinations December 2018
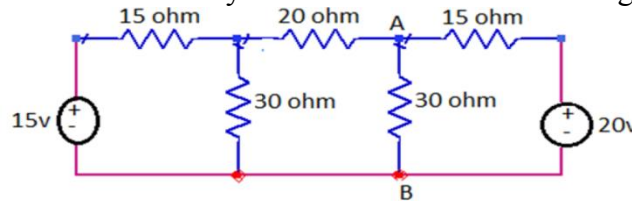**ELECTRICAL CIRCUITS**
(ELECTRICAL & ELECTRONICS ENGINEERING)

Time: **3 hours**   Max. Marks:**60**

(Answer all Five Units **5 X 12 = 60**Marks)
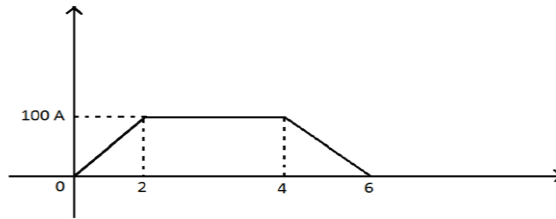
UNIT-I

1 **a.** State and explain the voltage current relationship for: 6M
  (i) Resistance. (ii) Inductance. iii) Capacitance.
 **b.** Determine the current in branch A-B by Kirchhoff's laws shown in figure.   6M

OR

2 **a.** Differentiate between active and passive elements with suitable examples.   6M
  b. A current wave form flowing through an inductor of 1mH is shown in the figure. Obtain
  and sketch the waveform of the voltage across the inductor.   6M

UNIT-II

3 **a.** Define power factor. What is its Importance in a.c. Circuits?   6M
  b. Find the form factor of the half wave rectified sine wave shown in figure.   6M
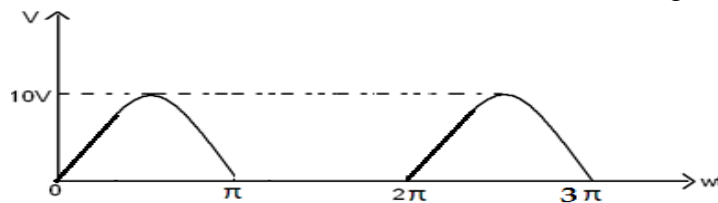
OR

4 **a.** Show that current lags voltage in RL series circuit.   6M
  b. The impedances of a parallel circuit are $Z1=(6+j8)\Omega$ and $Z2 =(8-j6)\Omega$.   6M
          If the applied voltage is 120V, find
              i. current and power factor of each branch
              ii. Overall current and power factor of the circuit
              iii. Power Consumed by each impedance.

UNIT-III

5 **a.** Draw the Locus diagram of a Series RL Circuit?   6M
  b. A coil of inductance 0.1H and resistance 10 ohms is connected in series with a capacitor of
  0.1 micro farads. Find frequency of resonance of the circuit, also find quality factor of the
  circuit at resonance.   6M

OR

6 **a.** Write the comparison between series resonance and parallel resonance? 6M

b. Two coils one of R1=0.51Ω, L1=32mH and other coil of R2=1.3Ω, L2=15mH are in series and are connected in series with a capacitor of C1=25μF, C2=62μF and a resistor of R3=0.24Ω. Determine

(a) Resonant frequency (b) Quality factor of the circuit (c) Bandwidth

(d) Power dissipated in the circuit at resonance frequency if the supply is 230V AC. 6M

UNIT-IV

7 **a.** State and explain Faraday's Laws of Electro Magnetic Induction. 6M

b. A coil is wound uniformly with 400 turns over an iron ring having a mean Circumference of 50 c.m and a cross section of 0.4 cm2. If the coil has resistance of 10 Ω and is connected across a 50 V D.C supply, Calculate the mmf of the coil, magnetic field strength, magnetic field density, total flux and reluctance of the ring. 6M

OR

8 **a.** Explain the difference between Electrical circuits and magnetic circuits. 6M

b. Two coils connected in series have an equivalent inductance of 0.8 H when connected in aiding, and an equivalent inductance of 0.5 H when the connection is opposing. If one of the coils has self inductance of 0.3 H, find mutual inductance of the coils and also find coefficient of coupling between the coils. 6M
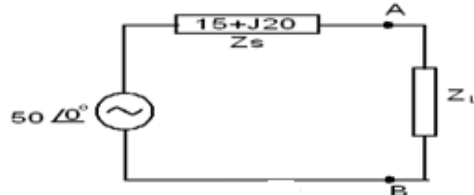
UNIT-V

9 **a.** State and explain tellegen's theorem. 6M

b. Find the voltage across 4Ω resistor in the circuit shown in figure.4 using Superposition theorem. 6M
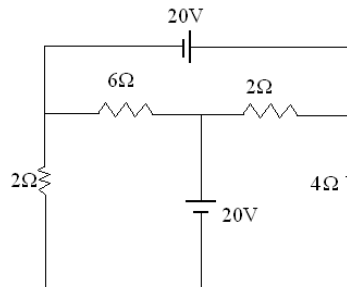
OR

10 **a.** State and explain Norton's theorem. 6M

b. Verify Reciprocity Theorem for the network shown in figure. 6M

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