

Code: 9A02305

R09

B.Tech II Year I Semester (R09) Supplementary Examinations June 2017

ELECTRICAL CIRCUITS

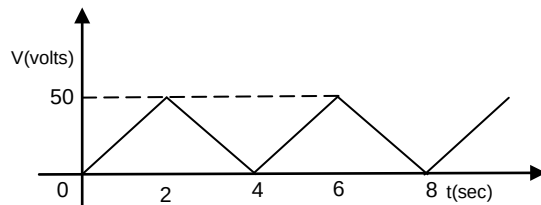
(Common to EEE, EIE, E.Con.E, ECE & ECC)

Time: 3 hours

Max. Marks: 70

Answer any FIVE questions
All questions carry equal marks

- 1 (a) What is the difference between an ideal source and a practical source? Draw the relevant characteristics of the above sources.
- (b) The voltage waveform shown in figure below is applied to a pure resistor of 10 ohm. Sketch the current waveform and instantaneous power.



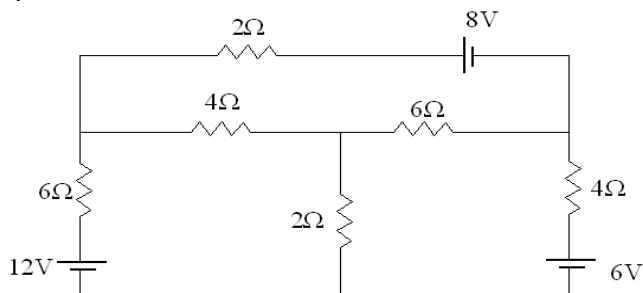
- 2 (a) Derive the expressions for n capacitors connected in parallel.
- (b) A heater element takes 8W of power when connected to the power mains. This element is redrawn such that the length of the element is doubled. Determine the power consumed now when connected to the same power mains.
- 3 (a) Derive the relation between RMS value and maximum value.
- (b) An iron cored coil draws 2A at 0.5 p.f. Lag against a 50 Hz, 100 V supply. Iron core being then removed, the voltage applied being 50V, the current rises to 5A to a p.f. of 0.78 lag. Find the inductance in each case.
- 4 (a) Explain all the characteristics of parallel resonant circuit with necessary derivations.
- (b) In a RLC series circuit, the resistance, inductance and capacitance are 10 ohm, 100mH 10 micro farad. Calculate ω_0 , ω_1 and ω_2 . Also find Band Width and selectivity.
- 5 (a) Derive expression for coefficient of coupling.
- (b) Two coils have self inductances of L_1 and L_2 respectively. When they are connected in series, the total inductance in series aiding and total inductance in series opposing are 25mH and 5mH respectively. Coefficient of coupling between coils is 0.6. Find out mutual inductance between coils, L_1 and L_2 .

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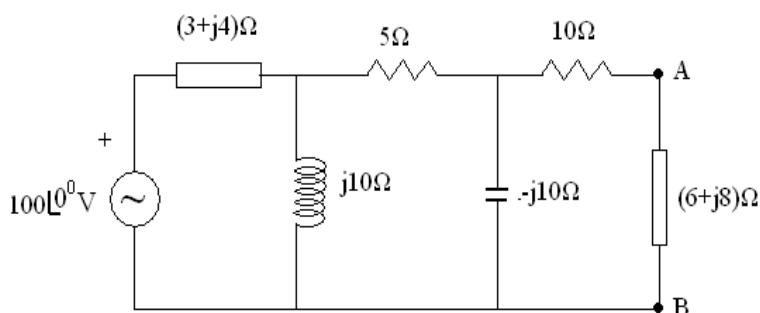
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- 6 Find out currents through and voltages across all branches of the network shown in figure with the help of its tie-set schedule.



- 7 (a) Write steps to find Norton's equivalent circuit for the given circuit.
(b) Calculate voltage across $(6+j8) \Omega$ impedance using Thevenin's theorem.



- 8 (a) State and explain Tellegen's theorem.
(b) Find change in current through 25Ω resistor, if it changes to 50Ω , use Compensation theorem.

