

JK LAKSHMIPAT UNIVERSITY, JAIPUR

INSTITUTE OF ENGINEERING AND TECHNOLOGY

End Term Examination (Special Backlog), November 2016

B. Tech.-CSE, Semester-II

Roll No.....

E-201: Electrical & Electronics Engineering

Time: 3 hours

Max. Marks: 100

Instructions to students:

1. Do not write anything other than your roll number on question paper.
2. Assume suitable data wherever required and mention it clearly.
3. Writing appropriate units, nomenclature, and drawing neat sketches/schematics/ flow chart wherever, required are an integral part of the answer.

Q.1 Objective type multiple choice questions (10 questions @ 1 mark)

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- i. Dependent voltage and current sources are (a) Unidirectional (b) output is dependent on input (c) independent of any other network variable (d) all of these
- ii. Star-delta transformation is employed to simplify circuit elements connected in (a) Series (b) Parallel (c) series parallel combinations (d) none of these
- iii. Which of the following theorems helps in simplifying computations when the load across a circuit is varying? (a) Superposition (b) Norton's (c) Thevenin's (d) Maximum power transfer
- iv. In applying the superposition theorem, (a) the sources are considered one at a time with all others replaced by their internal resistance (b) the sources are considered one at a time with all others replaced by their internal impedance (c) all sources are considered simultaneously (d) all sources are considered independently.
- v. The reactance offered by a capacitor to alternating current of frequency 50 Hz is 20 Ohm, if frequency is increased to 100 Hz, reactance becomes (a) 2.5 ohm (b) 5 ohm (c) 10 ohm (d) 15 ohm.
- vi. When an R-L-C series circuit is in resonance, the current through the circuit is determined by (a) V/X_L (b) V/R (c) V/X_C (d) none of these.
- vii. In Single Phase Transformer, The Primary Current and Primary Voltage is 4.55 Amp. and 11kV respectively. The Rating of the transformer would be: (a) 150 kVA (b) 100 kVA (c) 86 kVA (d) 50 kVA.
- viii. A Transformer _____. (a) Changes dc to AC (b) Changes ac to DC (c) Steps up or down DC Voltages & Current (d) Steps up or down AC Voltages & Current
- ix. When a diode is forward biased, the voltage across it: (a) is directly proportional to the source voltage (b) is directly proportional to the current (c) is inversely proportional to the current (d) remains approximately the same
- x. The element that has the biggest size in a transistor is: (a) Collector (b) base (c) Emitter (d) collector-base-junction

.2 Short answer type questions (4 questions @ 2.5 marks)

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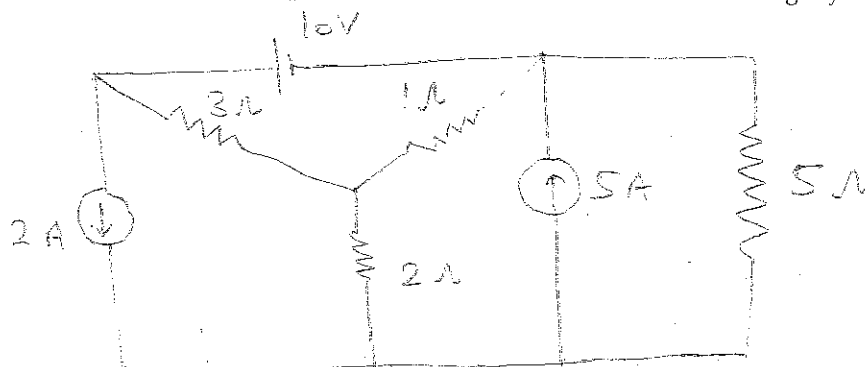
- i. State and explain Kirchhoff's current and voltage laws.
- ii. What are the differences between DC circuit and AC circuit?
- iii. What is power factor? Discuss the practical importance of power factor.
- iv. What are the applications of step-up and step-down transformers?

.3A Explain the nodal voltage method for solving a network. How are the nodal equations written?

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.3B Find the power delivered by the 5 Amp. Current source in the circuit shown in fig. by using the nodal method.

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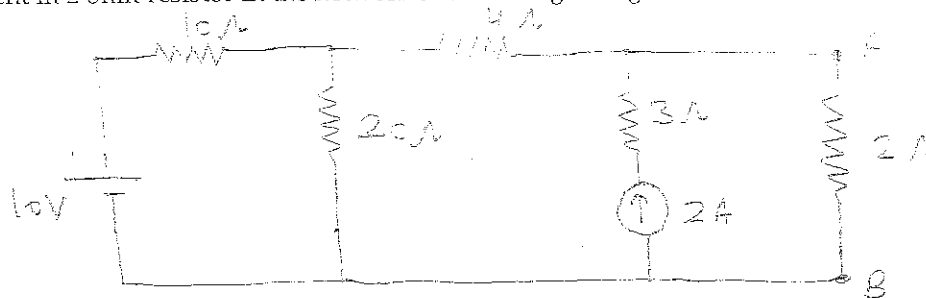


4A State and explain Norton's theorem. Show that this theorem is just the converse of Thevenin's theorem.

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Calculate current in 2 ohm resistor in the network shown in fig. using Thevenin's theorem.

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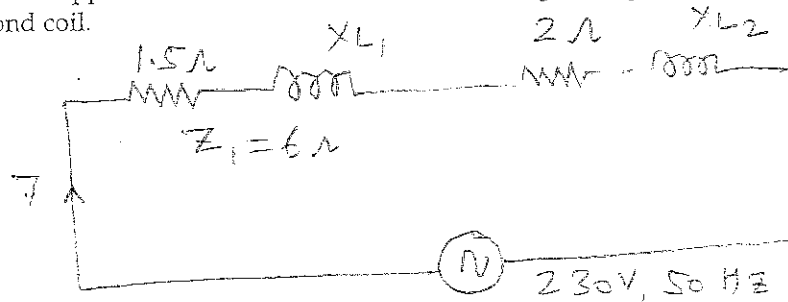


Derive the expression for impedance, phase angle, power factor, current, voltage, reactance, apparent power, real power and reactive power for R-L series circuit.

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A coil of resistance 1.5 ohm and impedance 6 ohm is placed in series with a second coil of resistance 2 ohm. When a voltage of 230 V, 50 Hz is applied to the circuit, the current flowing through the circuit is 7 Amp. Find the inductance of the second coil.

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1. Explain the construction and principle of operation of a DC generator with neat sketch.

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2. A coil having a resistance of 10 ohm and an inductance of 125 mH is connected in series with a 60 μ F capacitor across a 120 V supply. At what frequency does resonance occur? Find the current flowing at the resonant frequency.

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OR

3. Describe the construction details of transformer and also explain the principle of operation.

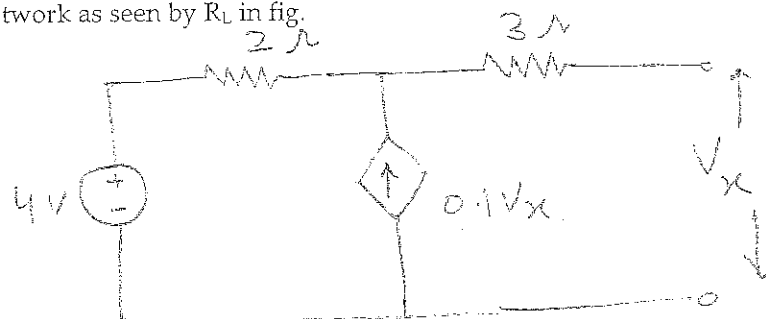
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4. Explain the operation of centre tapped full-wave rectifier with neat diagram.

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5. Obtain Norton's equivalent network as seen by R_L in fig.

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OR

B. Describe the working of a P-N junction diode with neat diagrams. Also explain its V-I characteristics.

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A three-phase balanced delta-connected load is connected to a three-phase, 400 V, 50 Hz supply. It draws a line current of 34.64 Amp. At 0.8 power factor lagging. Determine resistance and inductance of each branch. Further, determine the power drawn by each phase and draw the phasor diagram.

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A. A resistor of 20 ohm, Inductor of 0.05 H and a capacitor of 50 μ F are connected in series. Supply voltage of 230V, 50 Hz is connected across the series combination. Calculate the following: (a) Impedance (b) Current drawn by the circuit (c) Phase difference and power factor, and (d) Active and reactive power consumed by the circuit. (e) Draw the phasor diagram.

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B. The secondary of a 500 kVA, 4400/500 V, 50 Hz, single-phase transformer has 500 turns. Determine (i) emf per turn (ii) primary turns (iii) Primary and secondary full load current (iv) Maximum flux.

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OR

B. Two Wattmeters are connected to measure three-phase power for star-connected load reads 3 kW and 1 kW. The line current is 10 Amp. Calculate (a) line and phase voltage (b) resistance and reactance per phase.

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