

Code No: 53020

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY, HYDERABAD

B.Tech II Year I Semester Examinations, May/June - 2015

ELECTRIC CIRCUITS

(Common to ECE, ETM)

Time: 3 hours

Max. Marks: 75

Answer any five questions
All questions carry equal marks

- 1.a) Explain the relationship between Voltage and Current for a resistor with different input signals.
- b) A practical current source when connected to a load of 1Ω produces a voltage of 10 V and when connected to a load of 10Ω produces 20 V . Find the current source value and internal resistance value. [7+8]
- 2.a) Explain Kirchhoff's laws with the help of necessary examples.
- b) Using Mesh analysis, find the voltage across 3 A current source in the circuit shown figure 1 below. [7+8]

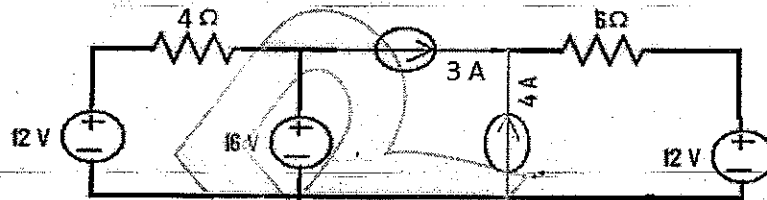


Figure: 1

- 3.a) Derive the RMS and Average values for a rectangular wave.
- b) For the circuit shown in the figure 2 below, determine the power absorbed by Load 1 and Load 3. Given $I_1 = 5 \angle -90^\circ \text{ A}$, $I_2 = 10 \angle 0^\circ \text{ A}$, Impedance of Load 3 is $15 \angle 75^\circ \Omega$ [7+8]

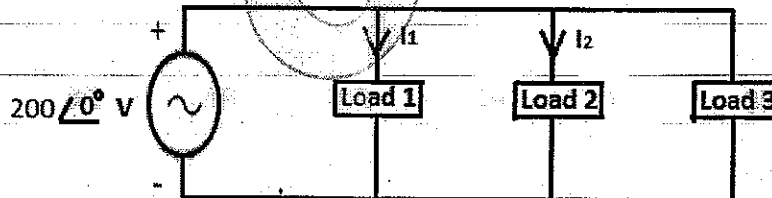
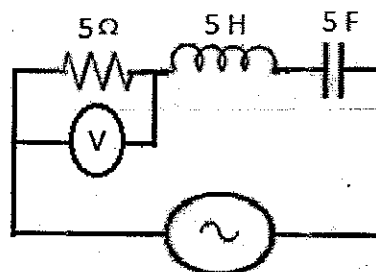


Figure: 2

- 4.a) Draw the locus diagram of parallel RLC circuit and explain.
- b) In the circuit shown figure 3 below, find the value of ω and quality factor for which the voltmeter reads 100 V . [7+8]



100√2 sin ωt V
Figure: 3

- 5.a) Define self and mutual inductances and explain the relationship between them.
 b) Draw a series magnetic circuit and explain the procedure to solve the circuit. [7+8]
- 6.a) Explain Planar network, Non planar network, Basic tie-set matrices with the help of examples.
 b) Explain the nodal method of analysis of networks with dependent and independent sources. [7+8]
- 7.a) State and explain Thevenin's theorem for DC excitations.
 b) Using Norton's theorem, find the current in the 2Ω resistor as shown figure 4 in the circuit below. [7+8]

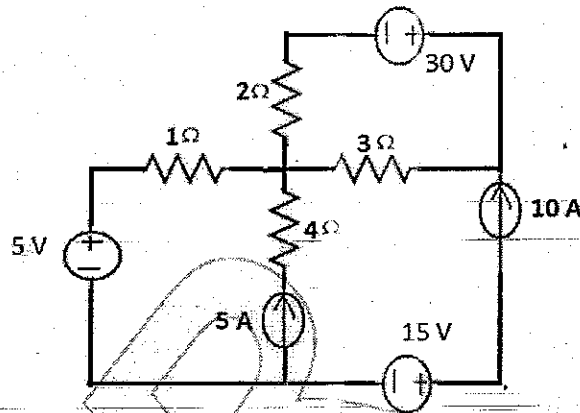


Figure: 4

- 8.a) State and explain Tellegen's theorem for AC excitations.
 b) State and explain Millman's theorem for AC excitations. [8+7]

---ooOoo---