Reg. No.										

Manipal Institute of Technology, Manipal

(A Constituent Institute of Manipal University)

III SEMESTER B.TECH (INSTRUMENTATION & CONTROL ENGINEERING)

END SEMESTER EXAMINATIONS, NOV/DEC 2015

SUBJECT: ELECTRICAL CIRCUIT ANALYSIS [ICE 2101]

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

- Answer **ALL** the questions.
- Missing data may be suitable assumed.

1A. For the circuit shown in FIG. Q1A, Determine i_1, i_2, i_3, i_4, and also the current supplied by 1V battery using KCL. **5**

1B. For the circuit shown in FIG. Q1B, find the current in R_L using superposition theorem transfer. **3**

1C. Using Millman's theorem determine current in 10Ω resistor shown in FIG.Q1C. **2**

2A. For the circuit shown in FIG. Q2A, find V_{TH} and Z_{TH} across R_L. **5**

2B. Obtain the values of R, L and C in a series RLC circuit that resonates at 1.5 KHz, and consumes 50W from a 50V ac source operating at resonant frequency. The band width is 0.75 K Hz. **3**

2C. A series RLC circuit with R =25 Ω and L = 0.6H has a leading phase angle of 60° at a frequency of 40cps. At what frequency will the circuit be resonant? **2**

3A In the network shown FIG. Q3A, the switch is opened at t=0, a steady state having previously been attained. Solve for i(t). **5**

3B. For the network shown in FIG. Q3B, find V, dV/dt & d^2V/dt^2 at t=0+. **3**

3C. For the network shown in FIG. Q3C, a steady state is reached with switch open. At t=0 the switch is closed. Solve for i(t) for t≥0. **2**

4A. For the network shown in FIG. Q4A, the switch is closed at t=0. Determine i(t) for t≥0 using Laplace transform. **5**

4B. A pulse of duration 1Sec.is applied to a series RL circuit with R= 1Ω and L = 1H at t = 0. Obtain expression for current for t≥0 using Laplace transform. **3**

4C. Express the waveform shown in FIG. Q4C using basic signals and write the Laplace transform. **2**

5A. Find Y and Z parameters for the network shown in Fig.Q5A **5**

5B. For the reduced incidence matrix of a linear graph is shown below draw the oriented graph. Construct tie set matrix selecting a tree with the branches 2and 3. **3**

$$\begin{bmatrix} 1 & 0 & -1 & -1 & 1 & 0 \\ -1 & 1 & 0 & 0 & -1 & -1 \end{bmatrix}$$

5C. For the network shown in FIG. Q5C, draw the oriented graph. Select a tree with branches 1 & 3 and construct the cut-set matrix. **2**

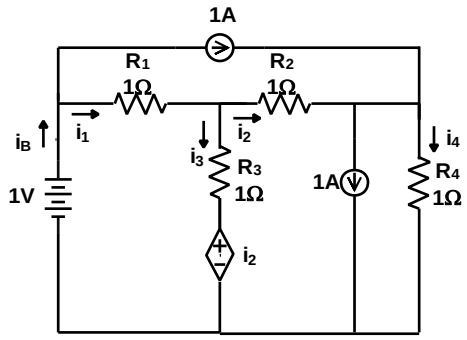

FIG. Q1A

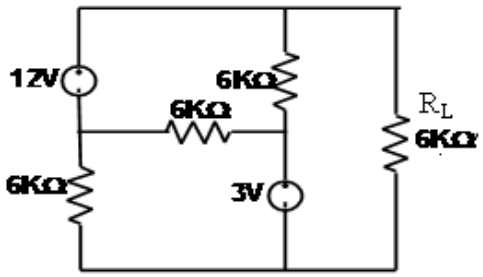

FIG. Q1B

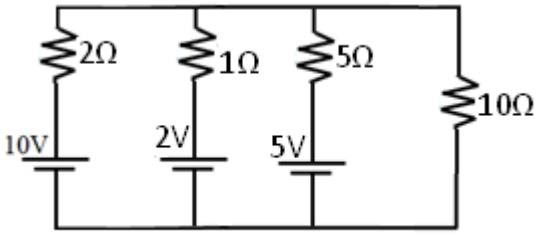

FIG. Q1C

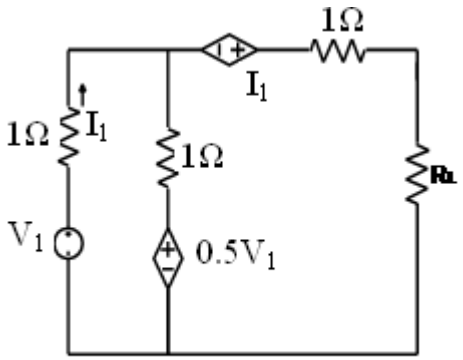

FIG. Q2A

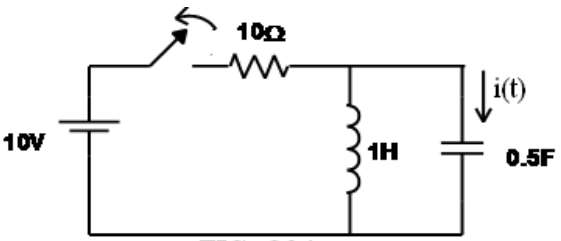

FIG. Q3A

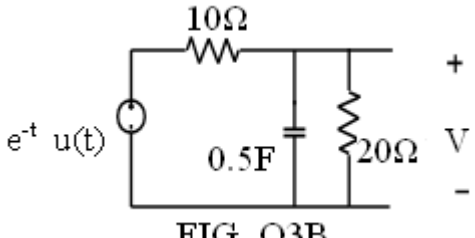

FIG. Q3B

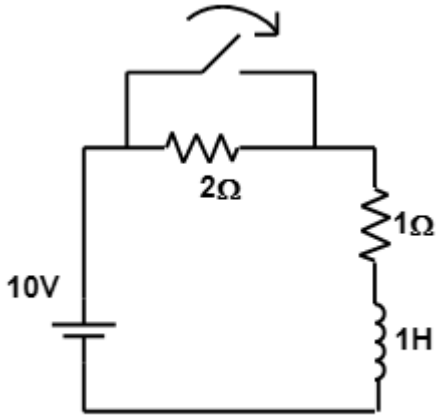

FIG. Q3C

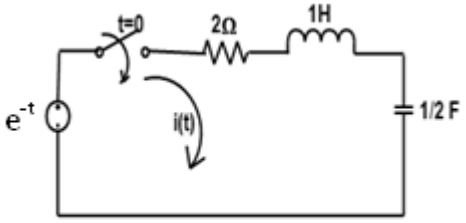

FIG. Q4A

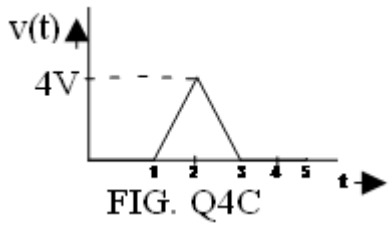

FIG. Q4C

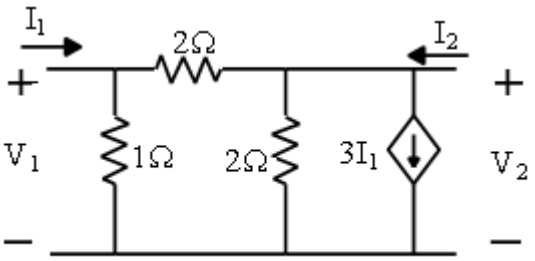

FIG. Q5A

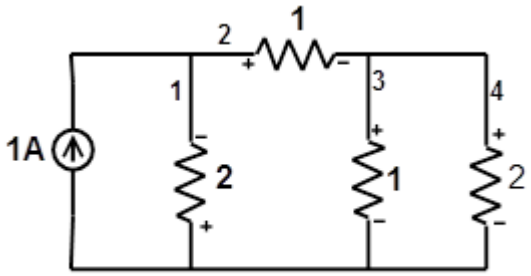

FIG. Q5C