Reg No					
Neg. 110.					



MANIPAL INSTITUTE OF TECHNOLOGY Manipal University

THIRD SEMESTER B.TECH (E & C) DEGREE END SEMESTER EXAMINATION NOV / DEC 2015 SUBJECT: NETWORK ANALYSIS (ECE - 2103)

TIME: 3 HOURS

MAX. MARKS: 50

Instructions to candidates

- Answer **ALL FIVE** full questions.
- Missing data may be suitably assumed.
- Do not use Laplace Transforms unless specified.
- 1A. Find the branch voltages V_1 to V_4 using KVL for the circuit shown in Figure. Q1A.
- 1B. Derive the relationship between L_{eq} and L_1 , L_2 and M for the circuit shown in Figure. Q1B.

(5+5)

- 2A. Find the Norton's equivalent between terminals a-b for the circuit shown in Figure. Q2A.
- 2B. A 120-V dc generator energizes a motor whose coil has an inductance of 50 H and a resistance of 100Ω . A field discharge resistor of 400Ω is connected in parallel with the motor to avoid damage to the motor, as shown in Figure.Q2B. The system is at steady state. Find the current through the discharge resistor after 100 ms of activating the circuit breaker.

$$(5+5)$$

3A. Find the particular solution to the differential equation $\frac{d^2V}{dt^2} + 5\frac{dV}{dt} + 6V = e^{-2t} + 5e^{-3t}$ for the

following initial conditions: $V(0+) = 2; \frac{dV}{dt}(0+) = -1.$

3B. The limited ramp shown in Figure. Q3B is applied to an RC differentiator. Draw to scale the output waveform for the cases: (a) T = RC (b) T = 0.2 RC (c) T = 5 RC.

(5+5)

- 4A. In the series RL circuit shown in Figure. Q4A, the switch is closed on position 1 at t = 0 and then at $t = t' = 50 \mu s$ it is moved to position 2. Find the current i(t) in the intervals 0 < t < t' and t > t' using Laplace Transform.
- 4B. Obtain the z and y parameters for the network shown in Figure. Q4B.

(5+5)

- 5A. Write the loop equations for the circuit shown in Figure. Q5A.
- 5B. Find Vo in the network shown in Figure. Q5B.
- 5C. Find V_0 in the network shown in Figure. Q5C using Thevenin's Theorem.

5D. For the network shown in Figure. Q5D, L= 1H and C= 1F, determine $G_{12} = \frac{V_2(s)}{V_1(s)}$.

(2.5x4)

ECE 2103



ECE 2103

Page 2 of 2