Reg. No.					



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 candidatesAnswer ALL questions.
 - Missing data may be suitably assumed.
 - Do not use Laplace Transform unless specified.

1A. Find the branch currents I_1 , I_2 , I_3 and I_4 using KCL for the circuit shown in Fig. Q1A.

1B. Derive the relationship between L_{eq} and L_1 , L_2 and M for the circuit shown in Fig. Q1B.

(5+5)

- 2A. Find the Thevenin's equivalent between terminals a-b for the circuit shown in Fig. Q2A.
- 2B. The circuit in Fig. Q2B is used by a biology student to study "frog kick." She noticed that the frog kicked a little when the switch was closed but kicked violently which makes the switch open for 5 sec. Model the frog as a resistor and calculate its resistance. Assume that it takes 10 mA when the frog kicks violently.

$$(5+5)$$

3A. Find the particular solution to the differential equation $\frac{d^2q}{dt^2} + 5\frac{dq}{dt} + 6q = te^{-t}$ for the following

initial conditions: q(0+) = 2; $\frac{dq}{dt}(0+) = -1$.

3B. A 10 Hz symmetrical square wave is fed to an amplifier. Calculate and plot the output waveform under the following conditions: the lower 3-dB frequency is (a) 0.3 Hz (b) 3 Hz (c) 30 Hz.

(5+5)

- 4A. In the circuit shown in Fig. Q4A, switch 1 is closed at t = 0 and then, at t = t' = 4ms, switch 2 is opened. Find the current i(t) in the intervals 0 < t < t' and t > t' using Laplace Transform.
- 4B. Find the open circuit impedance parameters for the network shown in Fig. Q4B.

(5+5)

- 5A. Write the loop equations for the circuit shown in Fig. Q5A.
- 5B. Determine the voltages V1 and V2 in the network shown in Fig. Q5B using voltage division.
- 5C. Find V_0 in the circuit shown in Fig. Q5C using the Principle of Superposition.

5D For the network shown in Fig. Q5D, determine $Y_{12} = \frac{I_2(s)}{V_1(s)}$.

(2.5*4)

