Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent unit of MAHE, Manipal)

THIRD SEMESTER B.TECH. (E & C) DEGREE END SEMESTER EXAMINATION
NOVEMBER 2018
SUBJECT: NETWORK ANALYSIS (ECE - 2103)

TIME: 3 HOURS **MAX. MARKS: 50**

Instructions to candidates

- Answer **ALL** questions.
- Missing data may be suitably assumed.
- Do not use **Laplace Transforms** unless specified.

1A. In the circuit shown in Fig. Q1A, find the value of R_L to be connected between the terminals AB for maximum power transfer. Also find the maximum power delivered to the load.

1B. In the circuit shown in Fig. Q1B(a), if all the self-inductance values are 1H and mutual inductance values are 0.5H, find L_{eq}, the equivalent inductance shown in Fig. Q1B(b).

1C. For the circuit shown in Fig. Q1C, determine the value of i_2.

(4+3+3)

2A. For the circuit shown in Fig. Q2A, the switch is opened at t=0. Find:

a) $i(0^+)$ and $v(0^+)$

b) $\frac{di(0^+)}{dt}$ and $\frac{dv(0^+)}{dt}$

c) $i(\infty)$ and $v(\infty)$

2B. In the network of Fig. Q2B, the switch is opened at t = 0. Obtain the expression for $v(t)$ for t > 0. Assume zero initial conditions.

2C. In the network shown in Fig. Q2C, the switch is closed at t = 0. Find the expression for current $i(t)$. Assume zero current through inductor at t = 0.

(4+3+3)

3A. A square wave whose peak-to-peak value is 1V extends ±0.5V with respect to ground. The duration of the positive section is 0.1 seconds and of negative section is 0.2 seconds. If the waveform is impressed upon an RC differentiating circuit whose time constant is 0.2 seconds, what are the steady state maximum and minimum values of the output waveform. Sketch the output waveform.

3B. An ideal 1μs pulse of amplitude V is fed to an RC circuit. Calculate and plot the output for the following upper 3dB frequencies:

i. 10 MHz ii. 1 MHz iii. 0.1 MHz

3C. With the help of circuit and relevant expressions explain how low pass RC circuit can be used as an integrator.

(4+3+3)

4A. For the circuit shown in Fig. Q4A, if the input voltage $v_i = \alpha t$ for $t > 0$, find v_o for $t > 0$ using **Laplace Transform**.

4B. In the two-mesh network of Fig. Q4B, the switch is closed at t = 0 with the circuit previously unenergized. The circuit constants are: L_1 = 1H, L_2 = 4H, M = 2H, $R_1 = R_2$ = 1Ω, V = 1 Volt. Determine $i_1(t)$ and $i_2(t)$ using **Laplace Transform**.

4C. Find y(t), if $Y(s) = \frac{s}{(s^2+1)(s^2+2s+2)}$.

(4+3+3)

5A. Find the transmission parameters for the two-port network shown in Fig. Q5A.

5B. For the network shown in Fig. Q5B, find Z_{11}, Z_{12} and G_{12}.

5C. Express z parameters in terms of h parameters.

(4+3+3)

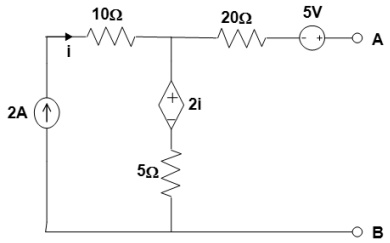

Fig. Q1A

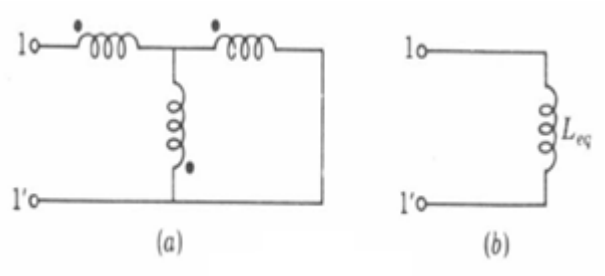

Fig. Q1B

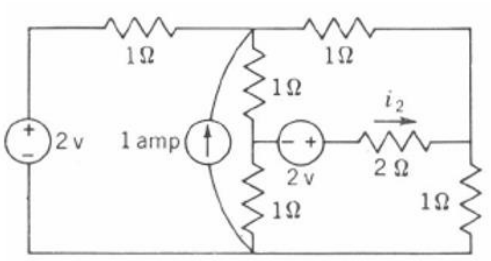

Fig. Q1C

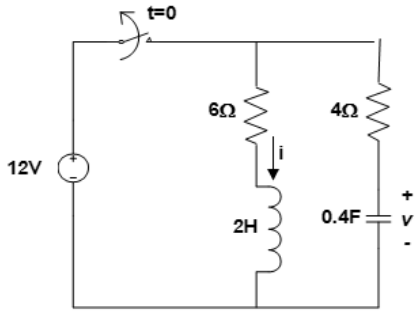

Fig. Q2A

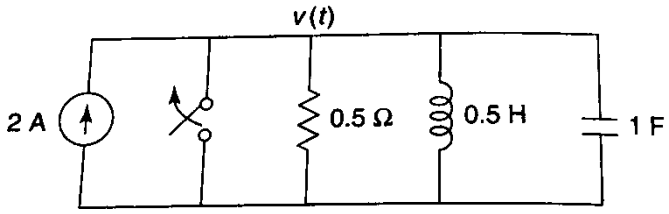

Fig. Q2B

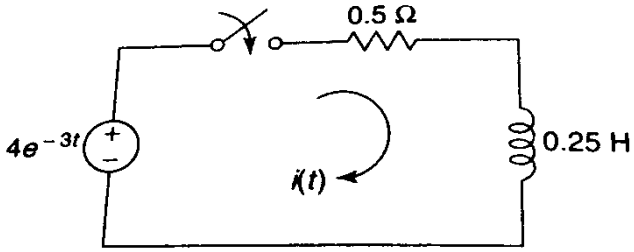

Fig. Q2C

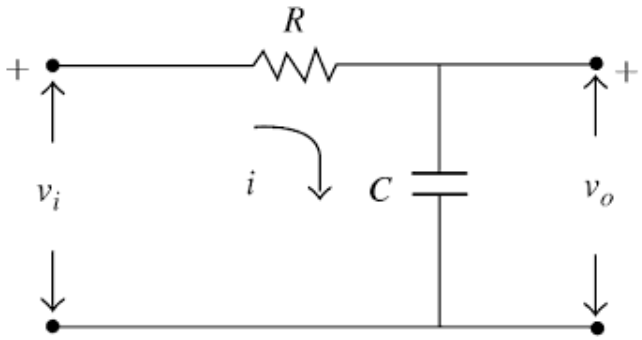

Fig. Q4A

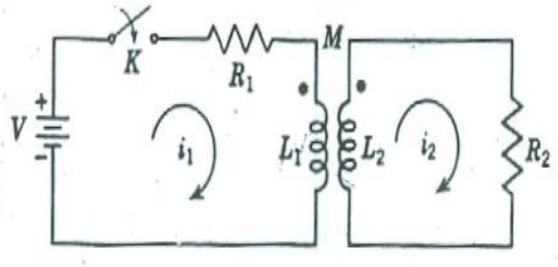

Fig. Q4B

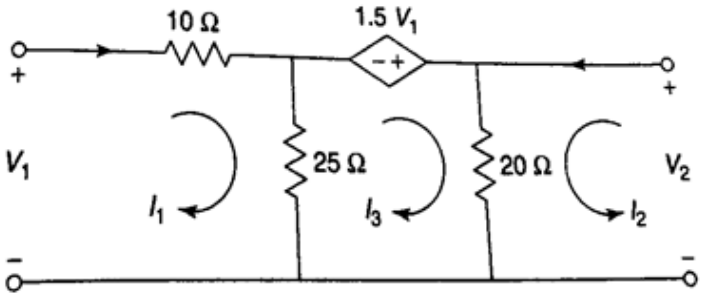

Fig. Q5A

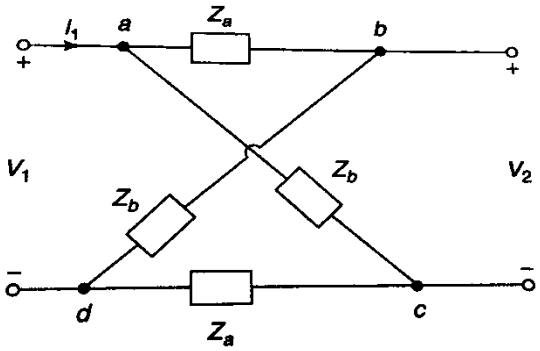

Fig.Q5B