Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY
Manipal University

THIRD SEMESTER B.TECH (E & C) DEGREE END SEMESTER EXAMINATION - NOV/DEC 2016
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 Transform** unless specified.

1A. For the circuit shown in Fig. Q1A,
(i) Determine the value of R_L for maximum power transfer.
(ii) Determine the maximum power that can be delivered to the load R_L.

1B. Using nodal analysis, determine V_1 and power being supplied by the dependent current source for the circuit shown in Fig. Q1B.

1C. Determine the equivalent resistance between the terminals A-B for the circuit shown in Fig. Q1C.

(5+3+2)

2A. For the circuit shown in Fig. Q2A Determine the following:
(i) $i(0+)$ and $v(0+)$
(ii) $\frac{di(0+)}{dt}$ and $\frac{dv(0+)}{dt}$
(iii) $i(\infty)$ and $v(\infty)$

2B. The voltage source in the network of the Fig. Q2B is described by the equation, $v_1 = 2\cos 2t$ for t ≥ 0 and is a short circuit prior to that time. Determine the general solution for $v_2(t)$.

2C. Determine the particular solution for the following homogeneous differential equation:

$\frac{d^2v}{dt^2} + 4\frac{dv}{dt} + 2v = 0$, subject to the initial conditions: $v(0^+) = 1, \frac{dv(0^+)}{dt} = -1$.

(5+3+2)

3A. An ideal 1μs pulse is fed to an RC circuit. Calculate and plot the output for the following upper 3-dB frequencies:
(i) 10 MHz (ii) 1 MHz (iii) 0.1 MHz

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

3C. For a high-pass RC circuit it is desired to pass 2ms sweep for a ramp input with less than 0.5% transmission error. Determine the highest possible value of the lower 3-dB frequency.

(5+3+2)

4A. In the series RL circuit shown in Fig. Q4A, the switch is closed on position 1 at t = 0 and then at t = t' = 60μs it is moved to position 2. Determine the current i(t) in the intervals 0 < t < t' and t > t'

using Laplace Transform.

4B. In the series RLC circuit shown in Fig. Q4B, there is no initial charge on the capacitor. If the switch is closed at t = 0, determine the resulting current using Laplace Transform.

4C. Write the equation for v(t) and Determine V(S) for the waveform shown in Fig. Q4C.

(5+3+2)

5A. Determine ABCD parameters for the network shown in Fig. Q5A

5B. For the resistive bridged-T two port network shown in Fig. Q5B, determine (i) G_{12} and (ii) Y_{12}

5C. Derive the expressions for z parameters in terms of y parameters.

(5+3+2)

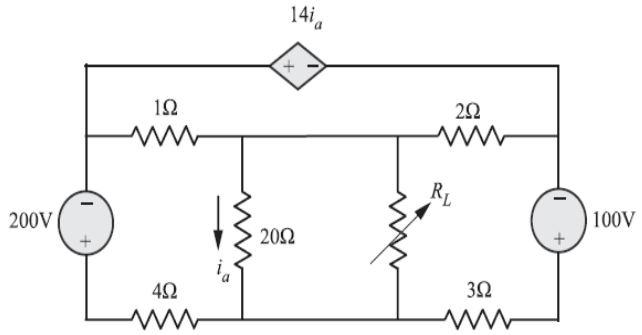

Fig. Q1A

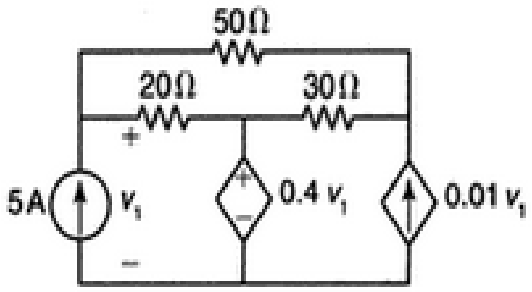

Fig. Q1B

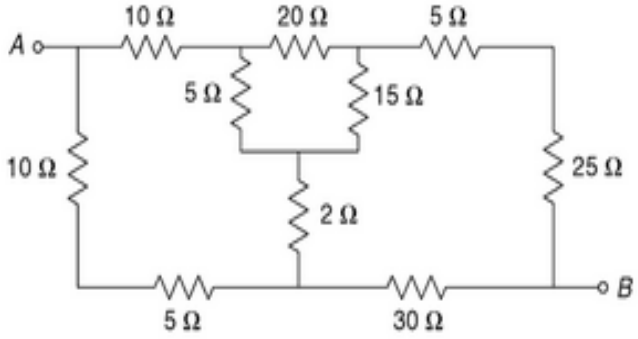

Fig. Q1C

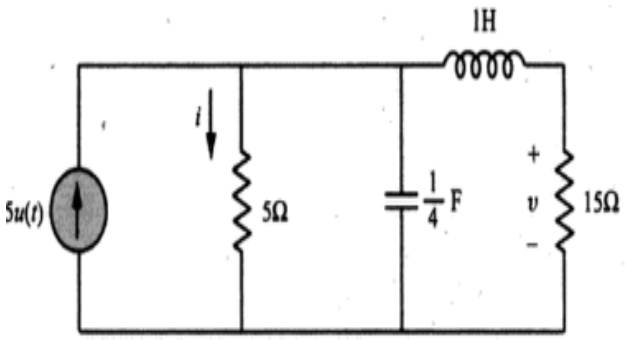

Fig. Q2A

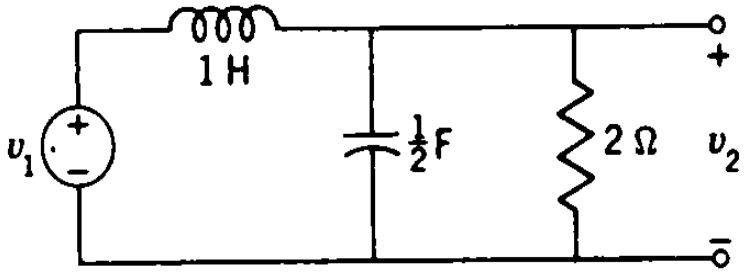

Fig. Q2B

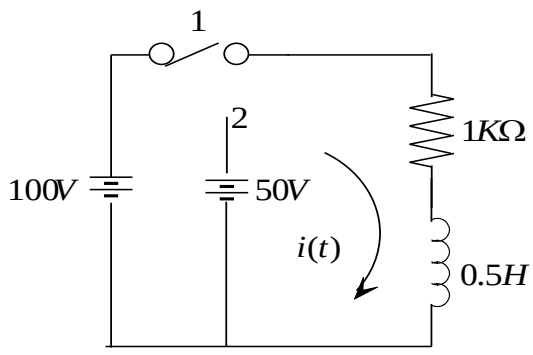

Fig. Q4A

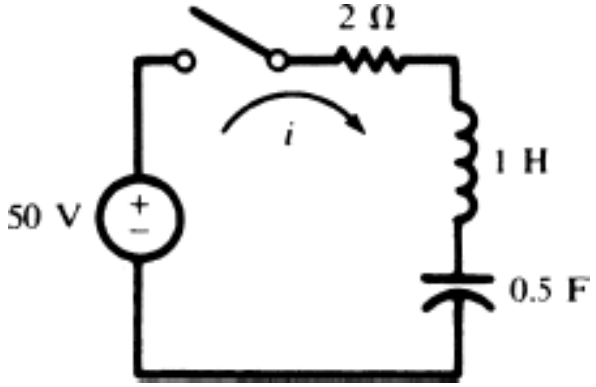

Fig. Q4B

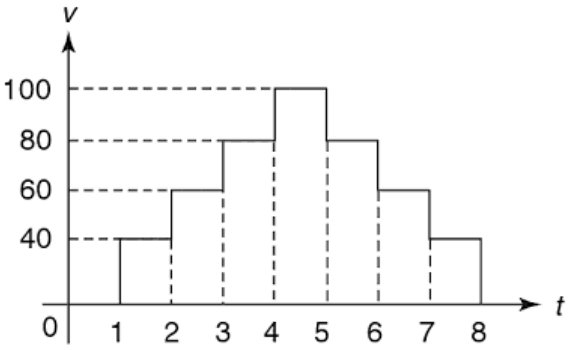

Fig. Q4C

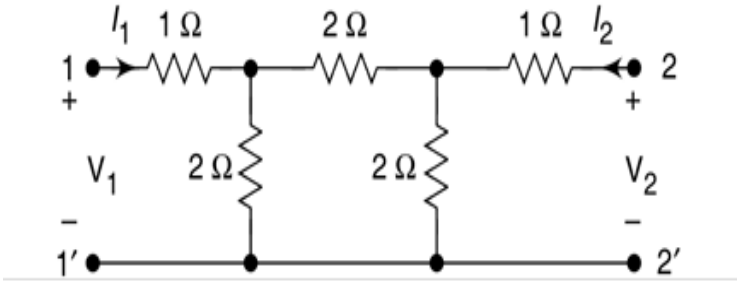

Fig. Q5A

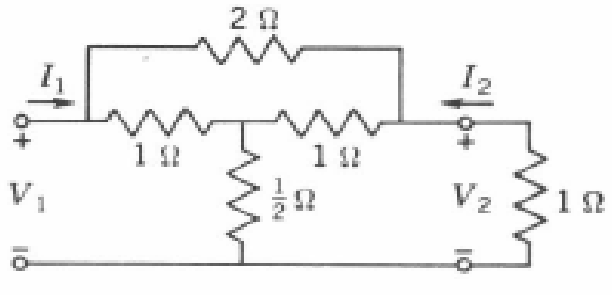

Fig. Q5B