Reg. No.									

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent Institution of MAHE, Manipal)

III SEMESTER B.TECH (ELECTRICAL & ELECTRONICS)

END SEMESTER EXAMINATIONS, NOVEMBER 2018

SUBJECT: ELECTRICAL CIRCUIT ANALYSIS [ELE 2101]

REVISED CREDIT SYSTEM

Time: 3 Hours **Date: 20 November 2018** **Max. Marks: 50**

Instructions to Candidates:

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

1A. For the network shown in Fig 1A, determine the value of R_L for maximum power transfer and also, find the value of maximum power transferred. ***(04)***

1B. In the network of Fig 1B, find the current through j3 Ω inductor using Superposition theorem. ***(04)***

1C. In the circuit of Fig 1C, find the current through 3 Ω resistor and hence verify Reciprocity theorem. ***(02)***

2A. In the circuit of fig 2A, draw the locus of total current if X_C varies from zero to infinity. Also, determine (i) currents at UPF (ii) values of X_C at resonance. ***(04)***

2B. The first derivative of the function f(t) is shown in Fig 2B. Sketch the function f(t). Also, determine the value of K such that $\int_{-\infty}^{+\infty} f(t)dt = 0$. ***(03)***

2C. Resolve the waveform given in Fig 2C into its even and odd components. ***(03)***

3A. In the circuit of Fig 3A, switch is moved from position A to B at t = 0. Find $v_{C1}(0^+), v_{C2}(0^+)\ and\ v_R(0^+)$. ***(02)***

3B. In the network of Fig 3B, the switch is moved from position A to B at t = 0 after attaining steady state in position A. Find an expression for the voltage across the capacitor for t > 0 using time domain analysis. ***(04)***

3C. In the network of Fig 3C, switch S_1 is closed at t = 0 and S_2 is opened at t = 4 m-sec. Obtain the expression for the current through the inductor for t > 4 m-sec using time domain analysis. ***(04)***

4A. In the network of Fig 4A, switch was in position A for a long time. At t = 0, switch is moved to position B. Draw the transformed network and hence write the mesh equations. Given $e(t) = e^{-t}Sin10t$. ***(04)***

4B. A series RL circuit with R = 3 Ω and L = 1 H is excited by a voltage $v(t) = 2e^{-4t}\,u(t)$. Determine the expression for current through the inductor for t > 0 using Laplace transform technique. ***(02)***

4C. The current response of a network is given by

$$I(s) = \frac{10(s^2+3s+2)}{(s+3)(s^2+2s+5)}$$

Determine i(t) using pole-zero diagram method. ***(04)***

5A. For the network shown in Fig 5A, determine the hybrid parameters. ***(04)***

5B. The networks shown in Fig 5B(i) and 5B(ii) are connected in parallel. Determine the overall Y parameters. ***(04)***

5C. A two port network is defined by the parameters: $Y_{21} = 6$, $Y_{22} = 8$, $h_{11} = 5$, $h_{12} = 2$. Find the T parameters. ***(02)***

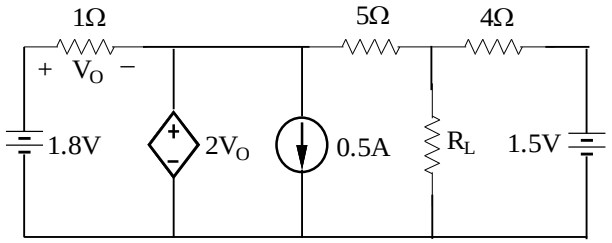

Fig 1A

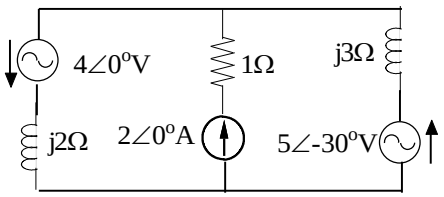

Fig 1B

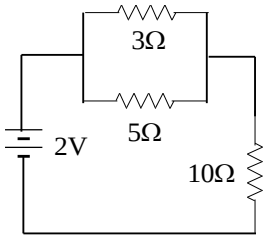

Fig 1C

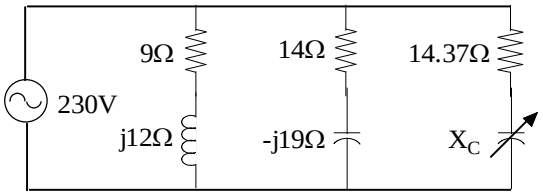

Fig 2A

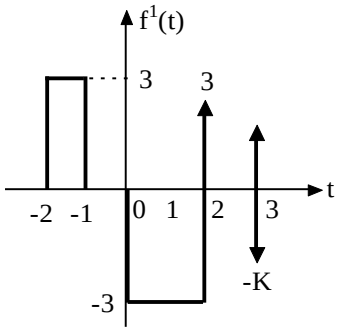

Fig 2B

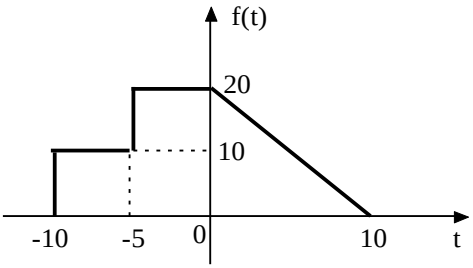

Fig. 2C

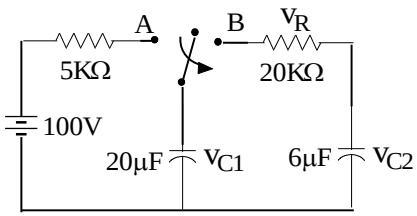

Fig 3A

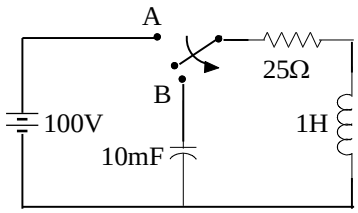

Fig 3B

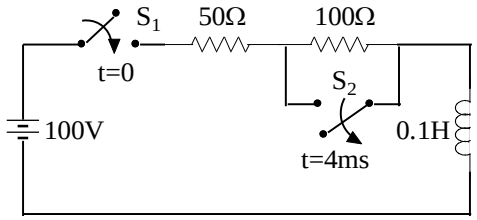

Fig 3C

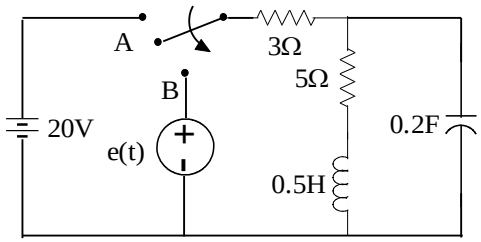

Fig 4A

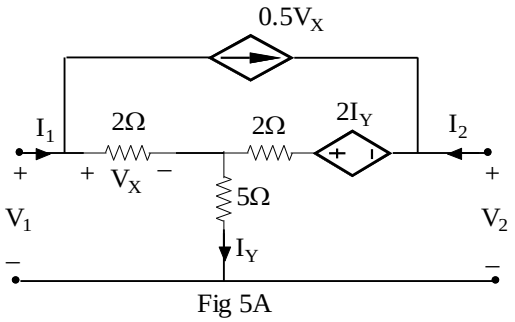

Fig 5A

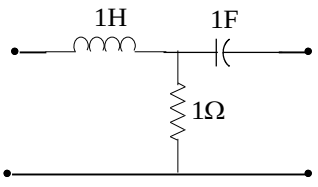

Fig 5B(i)

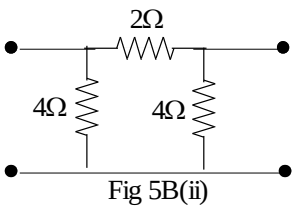

Fig 5B(ii)

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