Reg. No.									

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent Institution of MAHE, Manipal)

III SEMESTER B.TECH (ELECTRICAL & ELECTRONICS)

MAKE UP EXAMINATIONS, DECEMBER 2018

SUBJECT: ELECTRICAL CIRCUIT ANALYSIS [ELE 2101]

REVISED CREDIT SYSTEM

Time: 3 Hours **Date: 22 December 2018** **Max. Marks: 50**

Instructions to Candidates:

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

1A. In the network of Fig 1A, determine the current in the capacitor using Norton's theorem. ***(04)***

1B. In the circuit of Fig 1B, find the parameters of the coil to be connected across A and B for maximum power transfer to the coil. ***(02)***

1C. In the network of Fig 1C, find the voltage across 3Ω resistor using Superposition theorem. ***(04)***

2A. For the locus diagram shown in Fig 2A, draw the circuit configuration and write all the element values. Also, find the value of variable at unity power factor. ***(04)***

2B. Draw the odd and even components of waveform shown in Fig 2B. ***(03)***

2C. Evaluate the following integrals

i) $\int_{-\infty}^{\infty} \delta(t-5)\{u(t-2)+(t-4)u(t-4)\}dt$

ii) $\int_{-\infty}^{\infty} cost\ \{\delta(t-\pi)+\delta'(t-\frac{\pi}{2})+\delta''(t-\frac{\pi}{4})\}dt$

iii) $\int_{-\infty}^{\infty} e^{-jnt}\{A\delta(t)-2A\delta'(t-\pi)\}dt$ ***(03)***

3A. In the circuit of Fig 3A, switch is changed from A to B at t = 0, after attaining steady state at A. Determine $i_L, i_C, \frac{di_L}{dt}$ *and* $\frac{di_C}{dt}$ at t = 0^+. ***(03)***

3B. A series RLC circuit with R = 5Ω, L = 0.2H and C = 0.1F is excited by a voltage of v(t) = $15e^{-5t}$ at t = 0, the initial charge on the capacitor being 1 coulomb before t = 0. Determine the current in the circuit at t = 0.5 sec. Use time domain analysis. ***(04)***

3C. The network shown in Fig 3C is in steady state with the switch in position A. The switch is changed from A to B at t = 0. The current response of the circuit is i(t) = $4e^{-0.4t}$ u(t). Determine the values of R and C. ***(03)***

4A. A series RC circuit with R = 2Ω and C = 0.5F is excited by a voltage $e(t) = 2u(t) + 3r(t-1) - 3r(t-4) - 11u(t-4)$. Determine the current response of the circuit using laplace transform method. ***(03)***

4B. In the network of Fig 4B, switch is changed from A to B at t = 0, the steady state being achieved with switch at A before t=0. Determine the expression for current through the inductor using laplace transform method. ***(04)***

4C. Draw the pole – zero diagram of the function below. Hence find i(t).

$$I(s) = \frac{5(s^2 + s)}{(s+2)(s^2 + 2s + 10))}$$ ***(03)***

5A. Find the T parameters of the network shown in Fig 5A ***(04)***

5B. Two similar 2 port networks, each as in Fig 5B, are connected in parallel. Find the overall Z parameters. ***(04)***

5C. Given the h parameters of a network, deduce the values of Y parameters in terms of h parameters. ***(02)***

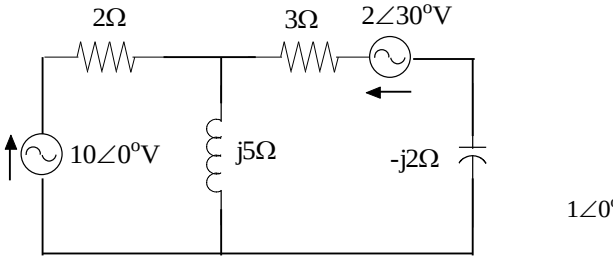

Fig 1A

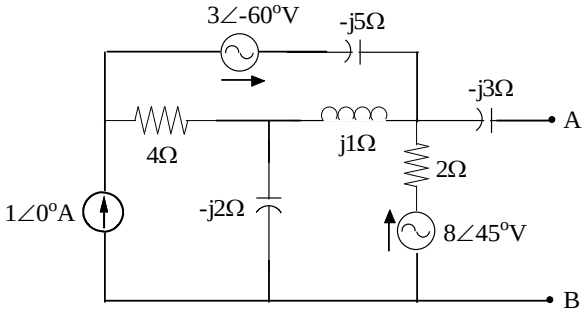

Fig 1B

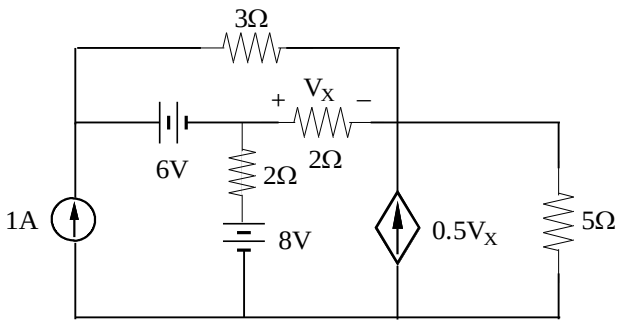

Fig 1C

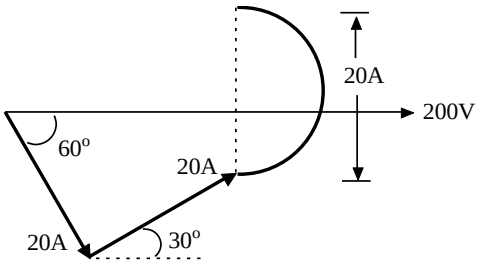

Fig. 2A

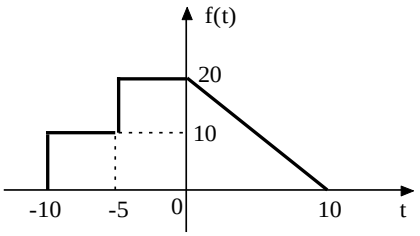

Fig 2B

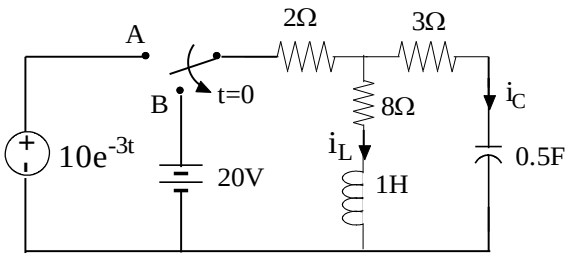

Fig 3A

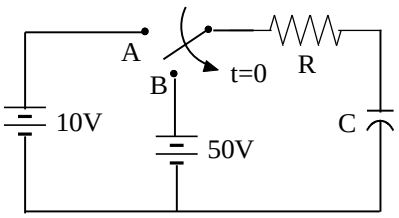

Fig 3C

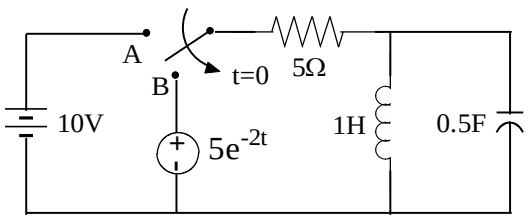

Fig 4B

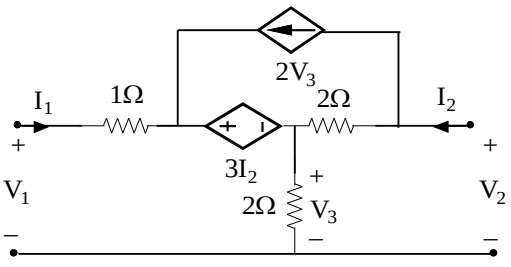

Fig 5A

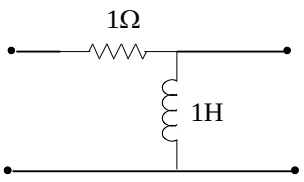

Fig 5B