Reg. No.									

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

A Constituent Institution of Manipal University

III SEMESTER B.TECH (ELECTRICAL & ELECTRONICS ENGINEERING)

MAKEUP EXAMINATIONS, DEC 2016 - JAN 2017

SUBJECT: ELECTRICAL CIRCUIT ANALYSIS [ELE 2101]

REVISED CREDIT SYSTEM

Time: 3 Hours **Date: 26 December 2016** **Max. Marks: 50**

Instructions to Candidates:

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

1A. In the network shown in Fig. 1A, determine the voltage across 30 Ω resistance using superposition theorem. ***(05)***

1B. For the network shown in Fig. 1B, determine the current through 2 Ω resistance using Thevenin's theorem. ***(05)***

2A. A two branch parallel circuit has R_C = 6 Ω in series with X_C = 8 Ω in one branch and X_L = 6.2 Ω in series with a variable resistance in the other branch. The circuit is connected to a 100V a.c. voltage source. Draw the locus of total current and determine the values of (i) minimum current (ii) current at unity power factor. ***(05)***

2B. Write the equation of the waveform shown in Fig. 2B in terms of step and ramp signals. Also, sketch its first derivative. ***(03)***

2C. Evaluate the integrals:

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

(ii) $\int_{-\infty}^{\infty} \cos t\left[\delta(t-\pi)-\delta(t-\frac{\pi}{2})+\delta^{11}(t-\frac{\pi}{4})\right]dt$ ***(02)***

3A. In the network of Fig. 3A, switch is closed at t = 0. Find $i_1, i_2, \frac{di_1}{dt}$ and $\frac{di_2}{dt}$ at t = 0^+. ***(05)***

3B. Obtain the step and hence the impulse response of a series RLC circuit with R = 5Ω, L = 1H and C = 0.1667F using time domain analysis. ***(05)***

4A. In the network shown in Fig.4A, switch moves from position 1 to position 2 at t=0. Find the total current response. Use Laplace transforms method. ***(05)***

4B. The transform of current response in a circuit is given by

$$I(s)=\frac{5(s^2+4s+3)}{(s^2+2s)(S^2+4)}$$

Find I(t) using pole zero diagram. ***(05)***

5A. Find the Laplace Transform of the waveform shown in Fig. 5A. ***(02)***

5B. Find the h parameters of the network shown in Fig. 5B. ***(04)***

5C. From fundamentals, deduce an inter-relationship to express z parameters in terms of transmission parameters. Hence calculate the values of z parameters, if ABCD parameters of a 2 port network is given as below.

A=2, B=-1, C=3, D=–2. ***(04)***

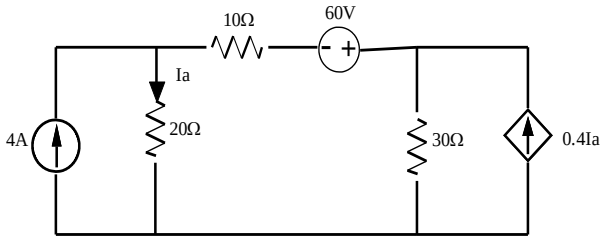

Fig. 1A

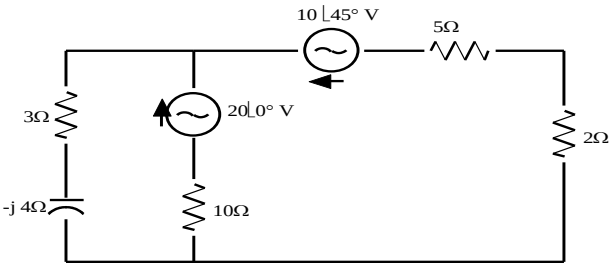

Fig. 1B

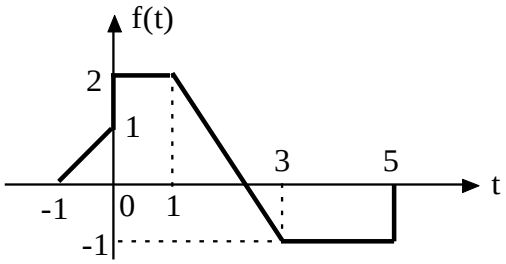

Fig. 2B

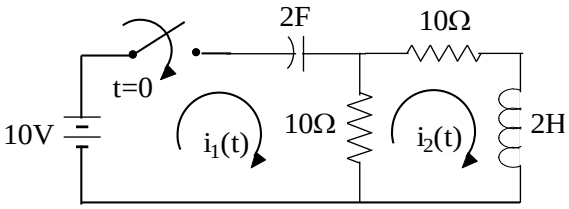

Fig. 3A

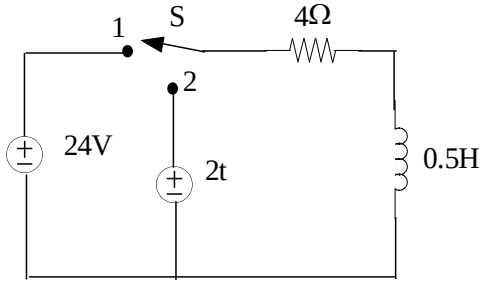

Fig. 4A

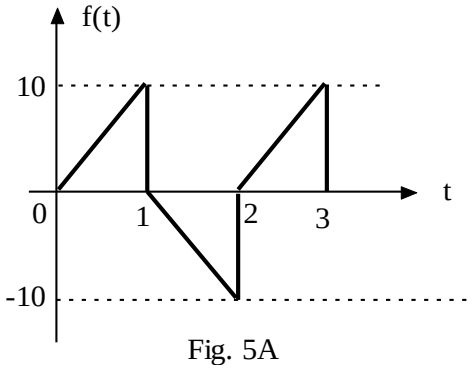

Fig. 5A

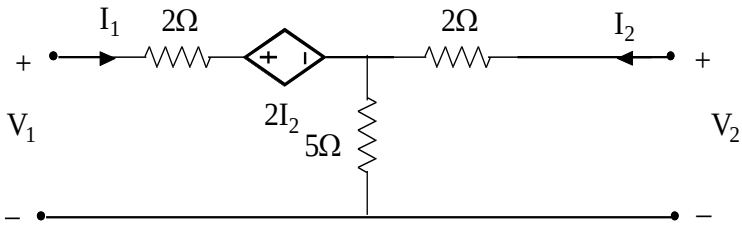

Fig. 5B