MANIPAL INSTITUTE OF TECHNOLOGY
MANIPAL
(A constituent unit of MAHE, Manipal)

III SEMESTER B.TECH (ELECTRICAL & ELECTRONICS ENGINEERING)
END SEMESTER PROCTORED ON-LINE EXAMINATIONS

JANUARY 2022

ELECTRICAL CIRCUIT ANALYSIS [ELE 2153]
REVISED CREDIT SYSTEM
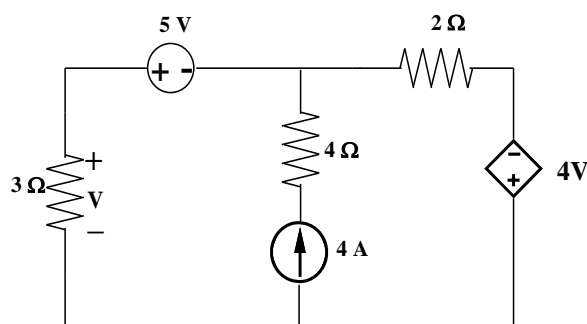
Time: 75 Minutes + 10 Minutes   **Date: 20 January 2022**   **Max. Marks: 20**

Instructions to Candidates:
- ❖ Answer **ALL** the questions.
- ❖ Missing data may be suitably assumed.
- ❖ Time: 75 minutes for writing + 10 minutes for uploading.

1A. For the circuit shown below, determine the current flowing through the 2Ω resistor using superposition theorem.
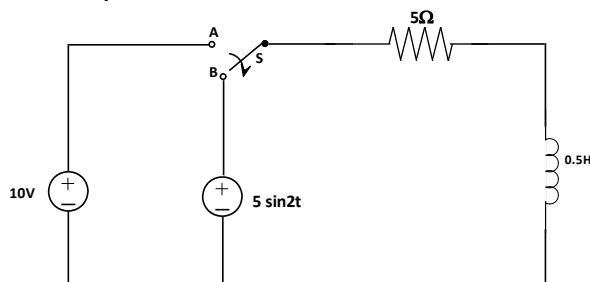

(03)

1B. Compute the convolution integral $y(t) = x(t) * h(t)$ of the following signals:

$x(t) = 2\{u(t) - u(t - 1)\}$ and $h(t) = u(t - 2) - u(t - 4)$

Plot the relevant waveforms for $x(t), h(t)$, and $y(t)$.   **(04)**

1C. In the circuit shown below, switch 'S' is changed from A to B at $t = 0$. Find the expression for the current through the inductor for $t > 0$ using Laplace transform analysis.
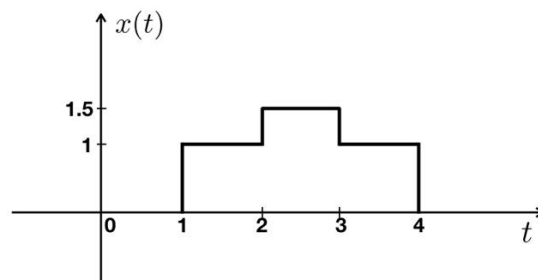

(03)

2A. Determine the complex exponential Fourier series representation of the following signal:

$$x(t) = \cos 3t + \sin 6t$$

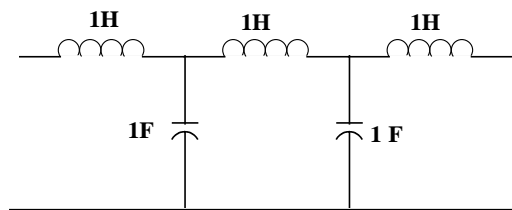Also, list the Fourier coefficients.   **(02)**

2B. Find the Fourier transform of the signal $x(t)$ shown below. The signal $x(t)$ is a linear combination of scaled and shifted versions of $x_1(t) = u(t + 0.5) - u(t - 0.5)$ and $x_2(t) = u(t + 1.5) - u(t - 1.5)$

(04)

2C. Determine the transmission parameters of the network by decomposing the network shown below into two networks in cascade.

(04)