Department of Electrical and Electronics Engineering
Mar Athanasius College of Engineering, Kothamangalam
(Government Aided Autonomous Engineering College)

First Sessional Examination -August 2026
B24EE2T01 Circuits and Networks- S3 EEE

Time: 1 hr. 30 min. Max Marks: 40

Part A [4x3 =12 marks]

1. Plot the DC response of a series RLC circuit based on damping effect. **[CO1]**

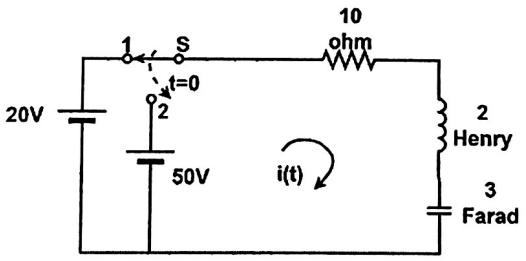
2. A circuit has resistance of 1000 Ω and a series capacitance of 0.1 μF. At time t = 0, it is connected to a 12V battery. Find the time constant of the circuit. **[CO1]**

3. Derive the Laplace Transforms by utilizing basic properties **[CO2]**
   a) $f(t) = t\,sin(2t)$ b) $f(t) = \sin^2(t)$ c) $f(t) = tcos(at)$

4. State and prove the final value theorem. **[CO2]**

Part B [2x14 = 28 marks]

5. For the network given below, switch S is moved from position 1 to 2 at t=0. Given that the switch was in position 1 for a long time. Perform time domain analysis to find the following:
   a) Inductor current and voltage at time t=0. (4)
   b) Expression for the current, i(t) for t > 0. (7)
   c) The value of i(t) at t=1 seconds and its final steady-state value. (3) **[CO1]**



6. Find the inverse Laplace transform of the following functions **[CO2]**
   a. $F(s) = \frac{50(s+2)}{(s+4)(s^2+4s+13)}$
   b. $G(s) = \frac{(5s^2-15s-11)}{(s+1)(s-2)^2}$

Students will be able to:
CO 1: Solve electric circuits under various switching conditions to determine transient and steady-state behavior in time domain.
CO 2: Apply and solve first and second-order DC circuits using Laplace transforms, considering initial conditions and damping effects.

VISION
Endeavour to Ensure Excellence

MISSION
Mould technically competent and morally strong Engineers
Achieve dynamic leadership through quality Education
Cater the needs of industry and community through Emulation
Empower the students to serve the nation with Dedication