007304

Mar. 2022

B.Tech. (EL) - III SEMESTER

Electric Circuit Analysis (ELPC-301)

Time : 90 Minutes]   [Max. Marks : 25

Instructions :

1. *It is compulsory to answer all the questions (1 mark each) of Part-A in short.*

2. *Answer any three questions from Part-B in detail.*

3. *Different sub-parts of a question are to be attempted adjacent to each other.*

PART-A

1.   (a) Explain compensation Theorem.   (1)

    (b) Mention the limitations of Ohm's Law.   (1)

    (c) Define time constant of RL circuit.   (1)

    (d) A 15 Ω resistor, an inductor with 8 Ω inductive reactance, and a capacitor with 12 Ω capacitive reactance are in parallel across an ac voltage source. Calculate the circuit impedance.   (1)

    (e) State dot rule for coupled coils.   (1)

    (f) A coil having inductance of 4 H and resistance of 2 ohms are connected across a 20 V dc source, find the steady state flowing current.   (1)

(g) Define coefficient of coupling. (1)

(h) What is the Laplace transform of delayed impulse function. (1)

(i) Write hybrid parameters equation. (1)

(j) Differentiate between zero input response and zero state response. (1)

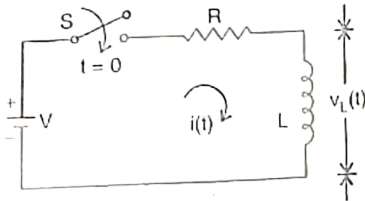## PART-B

2. For the given network
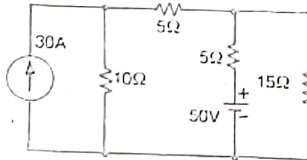
(a) Draw the equivalent Norton's circuit. (3)

(b) Determine the current through 15 ohm resistor. (2)

3. (a) Consider a series RL circuit as shown. The switch S is closed at time t = 0. Find the current i(t) through and voltage across the resistor. (5)

4. Derive the condition for series interconnection of two-2-port networks. (5)

5. Find the Laplace transform of t cos wt u(t). (5)

6. (a) Find the circuit element if the applied voltage and currents are $v(t) = 50 \sin (2000t + 65°)$ and $i(t) = 8 \sin (2000t + 95°)$. Find Z and draw the impedance diagram and phasor diagram. (3)

(b) Write the characteristics features of an ideal transformer. (2)