310605

Roll No. _____ Total No of Pages: 4

310605

B. Tech. III - Sem. (Main) Exam., February - 2021
Electrical Engineering
3EE4-05 Electrical Circuit Analysis
Common for EE/EEE

Time: 3 Hours **Maximum Marks: 120**

Instructions to Candidates:

Part – A: *Short answer questions (up to 25 words) 10 × 2 marks = 20 marks. All ten questions are compulsory.*

Part – B: *Analytical/Problem Solving questions (up to 100 words) 5 × 8 marks = 40 marks. Candidates have to answer five questions out of seven.*

Part – C: *Descriptive/Analytical/Problem Solving questions 4 × 15 marks = 60 marks. Candidates have to answer four questions out of five.*

Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of following supporting materials is permitted during examination. (Mentioned in form No. 205)

1. NIL 2. NIL

https://www.btubikaner.com

PART - A

Q.1 What is the utility of Superposition theorem? [2]

Q.2 How equivalent impedance is calculated in Thevenin Theorem? [2]

Q.3 How the RL circuit behaves for the step input? [2]

Q.4 Distinguish between steady state and transient state. [2]

Q.5 Why is impedance represented by a complex number? [2]

Q.6 State the Dot rule for coupled circuits. [2]

Q.7 What is Laplace transform? Define its applications. [2]

Q.8 How the RLC series circuit behaves for the frequencies above and below resonant frequencies? [2]

Q.9 Define transfer impedance and admittance. [2]

Q.10 What are the assumptions made in the analysis of two-part networks? [2]

PART – B

Q.1 What is the power loss in the 10Ω resistor in the network shown in Fig.1? Use mesh method. [8]

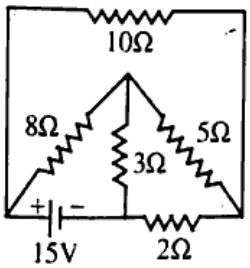

Fig.1

Q.2 State and explain Compensation theorem. [8]

Q.3 A resistance R and 5μF capacitor are connected in series across a 100V d.c. supply. Calculate the value of R such that the voltage across the capacitor becomes 50V in 5sec after the circuit is switched on. [8]

Q.4 For a circuit, the applied voltage is V=622 sin(2500t + 170°) volts, and the resulting current is i=31 sin(2500t-145°) amperes. Calculate the circuit constants and draw the phasor and impedance diagrams. [8]

Q.5 A two mesh network is shown in Fig.2. Obtain the expression for $I_1(s)$ and $I_2(s)$ when the switch is closed - [8]

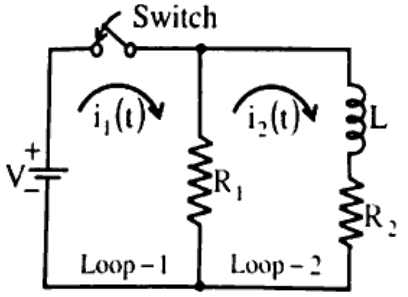

Fig.2

Q.6 Explain step response of RC series circuit. [8]

Q.7 Convert the following – [8]

(a) ABCD parameter into Y-parameter

(b) h-parameter into Z-parameter

PART – C

Q.1 Find the power loss in the 10Ω resistor in the circuit of Fig.3 using Norton's theorem - [15]

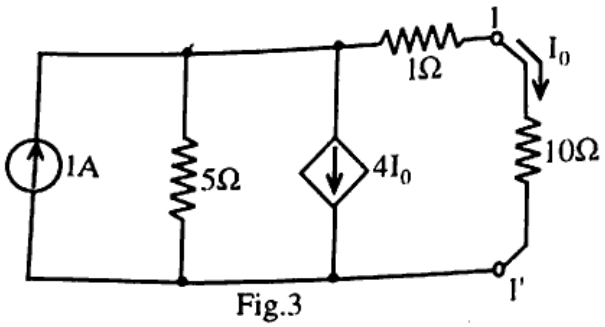

Fig.3

Q.2 If I=10A, and the switching is done at t=0, find v(t) for t > 0, if the initial capacitor voltage be 2V. The circuit is shown in Fig.4 - [15]

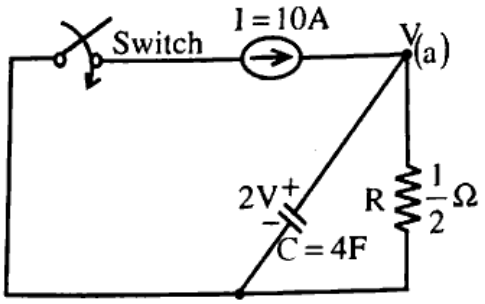

Fig.4

Q.3 In the coupled circuit of Figure 5, find the input impedance as well as the net inductance - [15]

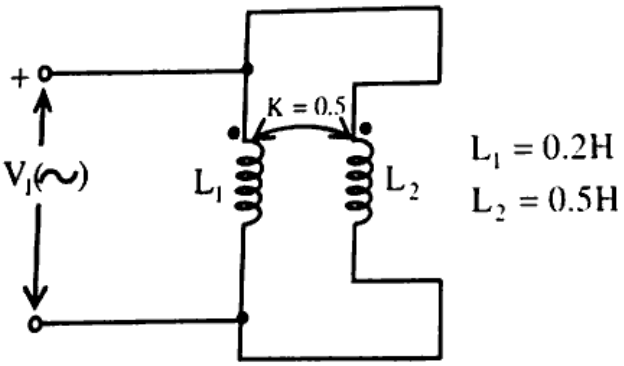

Fig.5

Q.4 In the circuit of Figure 6. Obtain expression for the current i(t) when the switch is moved from position (1) to position (2) at t=0. Use Laplace transform - [15]

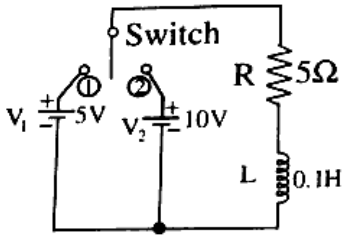

Fig.6

[15]

Q.5 In a two port network -

$Z_{11}=2\Omega$, $Z_{12}=Z_{21}=5\Omega$, $Z_{22}=1\Omega$

Find –

(a) Y-parameters

(b) h-parameters

(c) ABCD-parameters
