# B.Tech I Year (R13) Supplementary Examinations December 2019 <br> ELECTRICAL CIRCUITS <br> (Electrical \& Electronics Engineering) 

Time: 3 hours
Max. Marks: 70
PART - A
(Compulsory Question)
1 Answer the following: ( $10 \times 02=20$ Marks $)$
(a) Define about Active and Passive elements with examples
(b) When two branches having $(2+j 10) \Omega$ and $(5+\mathrm{j} 20) \Omega$ are connected in parallel and their equivalent is in series with $(8+j 30) \Omega$. Find the total equivalent impedance.
(c) Describe the importance of power factor.
(d) For half wave rectified alternating current, find form factor.
(e) Define and describe briefly about band width.
(f) Discuss briefly about Super Node with neat sketch.
(g) Write the statement of compensation theorem.
(h) Write any two applications of superposition theorem.
(i) List any two applications of Laplace transforms.
(j) Describe briefly about Line Spectra.

PART - B
(Answer all five units, $5 \times 10=50$ Marks)

## UNIT - I

2 (a) Explain in detail about resistance, inductance and capacitance parameters.
(b) An iron ring 10 cm diameter and $15 \mathrm{~cm}^{2}$ in cross section is wound with 250 turns of wire of flux density of $1.5 \mathrm{Web} / \mathrm{m}^{2}$ and permeability 500 . Find the exciting current, the inductance and stored energy. Find corresponding quantities when there is a 2 mm air gap.

OR
3 (a) Derive the relation between self and mutual inductances. Also, derive the expression for coefficient of coupling between two mutually coupled coils.
(b) Find the power dissipated at $6 \Omega$ resistor in the network shown below.


4 (a) Explain about how to calculate voltage and power in a balanced three phase circuit.
(b) For a half wave rectified alternating current find Average value, RMS value, Form factor and Peak factor. Find the average and RMS values when $I_{m}$ is $3 A$.

## OR

5 (a) Discuss in detail about unbalanced three phase delta circuits with inductive loads.
(b) Explain about two wattmeter method for measuring three phase power.

Contd. in page 2
www.FirstRanker.com
Code: 13A02101

UNIT - III
6 (a) Draw and explain in detail about the locus diagram for R-L-C series circuit.
(b) Write short notes on Graph, Tree and Link with examples.

OR
7 (a) In the circuit shown below, determine the power delivered to $4 \Omega$ resistor by mesh analysis.

(b) The reduced incidence matrix of a graph is given below. Draw the graph corresponding to it.

$$
\left[\begin{array}{cccccc}
-1 & +1 & 0 & 0 & 0 & -1 \\
0 & 1 & -1 & +1 & 0 & 0 \\
0 & 0 & +1 & 0 & -1 & +1
\end{array}\right]
$$

UNIT - IV
8 (a) Find the z-parameters of the network shown below.

(b) State and explain in detail about the maximum power transfer theorem with an example.

OR
9 (a) Discuss in detail about transmission and hybrid parameters and also derive their relation for two port network.
(b) Verify reciprocity theorem with a suitable example.

UNIT - V
10 (a) Explain in detail about DC transient $\mathrm{R}-\mathrm{C}$ series circuit.
(b) Describe in detail about trigonometric form and exponential form of Fourier series.

OR
11 (a) Discuss response of R-C networks for pulse excitation.
(b) Explain in detail about the transient response of R -L circuit for sinusoidal excitation.

