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Total No. of Pages : 02

Total No. of Questions : 09

B.Tech.(Electrical Engineering & Industrial Control) (2012 Onwards)
B.Tech.(EE/Electrical & Electronics/Electronics & Electrical) (2011 Onwards)
(Sem.-3)

CIRCUIT THEORY

Subject Code : BTEE-301

Paper ID : [A1134]

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

1. Answer briefly :

- a) Differentiate between independent and dependent sources.
- b) State superposition theorem.
- c) What do you mean by doublet? Explain.
- d) What do you mean by steady state response? Discuss its significance.
- e) What do you mean by impulse response? Explain.
- f) What do you mean by network functions? Explain.
- g) What do you mean by propagation constant? Explain.
- h) List the advantages and disadvantages of composite filters.
- i) Why network synthesis is required? Explain.
- j) Draw and explain the ladder network.

SECTION-B

2. State and prove Thevenin's theorem.
3. Discuss the following for two port networks :
 - a) Impedance and admittance functions.
 - b) Transfer functions.
4. Design T section of constant k high pass filter having nominal characteristic impedance of 600 ohm, cut-off frequency is 10 kHz. Also find its characteristics impedance and phase constant.
5. Find the current $i(t)$ in a series R-L-C circuit comprising $R = 5$ ohm, $L = 1$ H and $C = 0.25$ farad when impulse voltage $3 \delta (t-1)$ is applied.
6. What is a filter? Discuss its significance. Also explain the different types of filters in detail.

SECTION-C

7. Design T and π sections of m-derived low pass filter having cut-off frequency of 1 kHz, design impedance of 400 ohm, and resonant frequency 1100 Hz.
8. Synthesize the Foster I and II forms of realization of the RC driving point function :

$$Z_D(s) = \frac{2s^2 + 12s + 16}{s^2 + 4s + 3}$$

9. Discuss the following :
 - a) Convolution theorem.
 - b) Maximum power transfer theorem.