SHAHEED BHAGAT SINGH STATE TECHNICAL CAMPUS, FEROZEPUR

ROLL No: | | | | | | | | | | | | Total number of pages:[2]

Total number of questions: 06

B.Tech. || EE || 3rd Sem

Circuit Theory

Subject Code: BTEE-301A

Paper ID: (for office use)

Time allowed: 3 Hrs Max Marks: 60

Important Instructions:

- All questions are compulsory
- Assume any missing data

PART A (2×10)

All Cos

Q. 1. Short-Answer Questions:

(a) State superposition theorem.

(b) Discuss Kirchoff's Law.

(c) List the properties of an R-L admittance function.

(d) Define poles and zeros of the networks.

(e) Write Initial Value Theorem.

(f) State Maximum power transfer theorem.

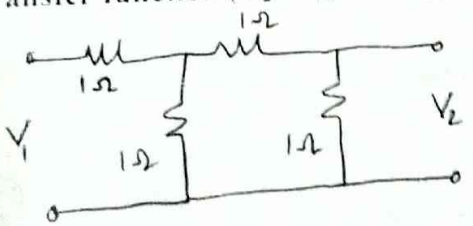
(g) Check the polynomial is positive real or not.

$$P(s) = s^3 + 6s^2 + 12s + 8$$

(h) A low pass filter has a cut off frequency of 2000 Hz. If the value of each inductor is 0.05H, find the value of each capacitor.

(i) Define network functions.

(j) Find transfer function (V_2/ V_1) in the given network.



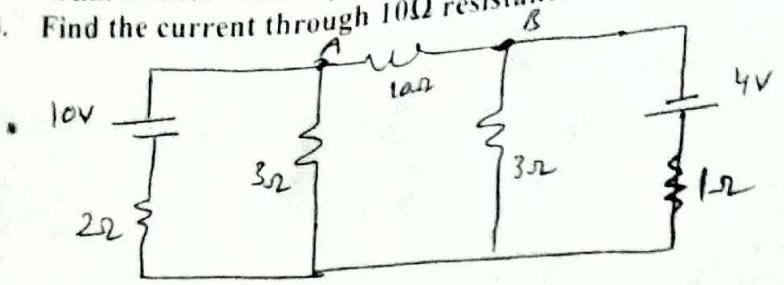
PART B (8×5)

Q. 2. Design an m-derived low pass filter having cut-off frequency of 1kHZ CO4 impedance of 400 Ω and resonant frequency 1100Hz (for both T section &

[] section). OR CO4

What is filter? Classify filters on the basis of frequency range in detail. CO1

Q. 3. Find the current through 10Ω resistance using superposition theorem.



b) Prove Convolution Theorem.

OR

State and explain Thevenin's theorem and also write its limitations. CO1

Q. 4. a) What is composite filter? Discuss the steps how to design it. CO4

b) Design constant k type low pass filter.

OR

Derive the characteristic impedance of T network and prove that CO4

$Z_T^2 = Z_{OC} Z_{SC}$

Q. 5. CO2

a) Check whether the given function

$P(s) = S^4 + S^3 + 2S^2 + 4s + 1$ is Hurwitz

b) Determine the range of k for which the system is stable.

$s^3 + 3ks^2 + (k+2)s + 4 = 0$

OR

a) Draw pole zero diagram for the given function and find i(t) CO2

$$I(s) = \frac{5s}{(s+1)(s+3)}$$

b) Write necessary and sufficient conditions for positive real function.

Q. 6. Synthesize the given impedance function in Cauer I & II form

$$Z(s) = \frac{(s+1)(s+3)}{s(s+2)}$$ CO3

OR

Diagnose whether the following impedance function represents RL or RC network and first foster and first cauer Form CO3

$$Z(s) = \frac{(s+2)(s+4)}{(s+1)(s+3)}$$