Roll No. .....

Total Pages : 5

017304

December 2023

B.Tech. (EEOT/ENC) IIIrd Semester

CIRCUIT ANALYSIS AND SYNTHESIS (ECP-305)

Time : 3 Hours]

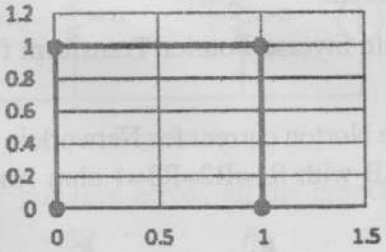
[Max. Marks : 75

Instructions :

1. *It is compulsory to answer all the questions (1.5 marks each) of Part-A in short.*
2. *Answer any four 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) Find the laplace transform of following waveform: (CO2) (1.5)



(b) In a series combination of R and L, the Inductor is having current I_{max} amp flowing through it at time t = 0. Derive an expression for current for time t > 0. (CO1) (1.5)

(c) Find the laplace transform of sinh(at). (CO2) (1.5)

(d) Find out the transfer admittance $Y_{12}(s)$ of the following network with R1 = R2 = R3 = 1 ohm (CO3) (1.5)

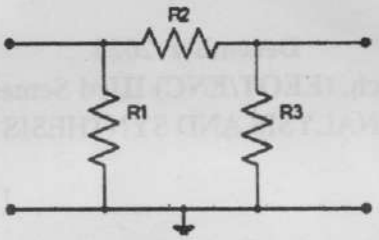


Figure 1.

(e) Calculate Current transfer ratio $I_{21}(s)$ for the network in Figure 1. (CO3) (1.5)

(f) Calculate the C parameter (part of ABCD) for network in Figure 1. (CO4) (1.5)

(g) State necessary conditions for function to be driving point immittance function. (CO) (1.5)

(h) Calculate the value of attenuation constant for T section of low pass filter having R0 = 600 Ohm, f = 1600 Hz, fc= 1000Hz. (CO5) (1.5)

(i) Calculate inverse Fourier Transform f(t) for F(w) =1. (CO2) (1.5)

(j) Find the Norton current for Network in Figure 2 between point AB with R1=R2=R3=1 ohm And VI = 10V (CO1) (1.5)

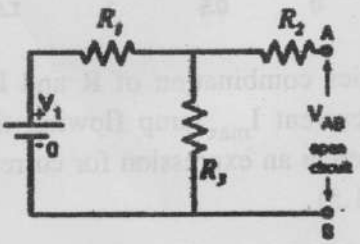


Figure 2.

PART–B

2. (a) Derive necessary relations for compensation theorem for AC circuit. Also state what is the utility of this theorem? (CO1) (7.5)

(b) Obtain the value of voltage v(t) across C in the parallel circuit of R & C to which parallel current source of pulse of height 1 ampere and duration 1 sec is applied. (CO2) (7.5)

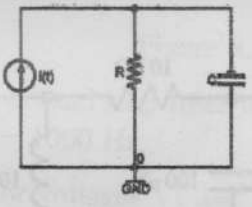


Figure 3.

3. (a) Verify the superposition theorem for current in 5 ohm resistance: (CO1) (7.5)

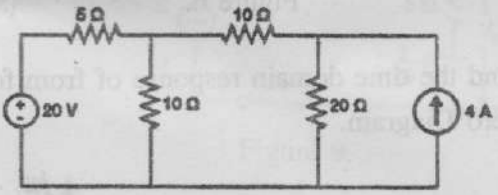


Figure 4.

(b) Solve for voltages across all the branches. (CO1) (7.5)

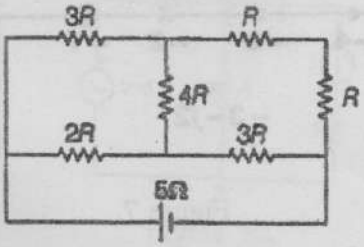


Figure 5.

4. (a) Prove condition for symmetry in terms of ABCD parameters. (CO4) (7.5)

(b) Prove condition for reciprocity in terms of G parameters. (CO4) (7.5)

5. (a) Calculate the Z12 and Zl1 for the circuit in Figure 6 in s domain. (CO3) (7.5)

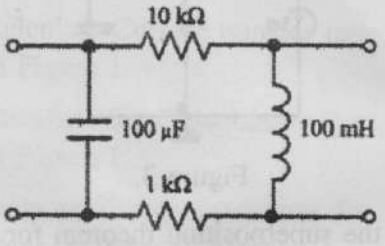


Figure 6.

(b) Find the time domain response of from following pole Zero Diagram. (CO3) (7.5)

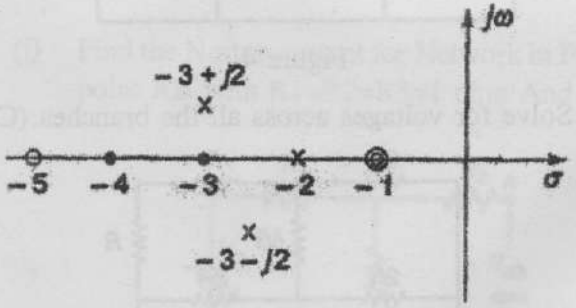


Figure 7.

(I.

6. (a) Find the Current transfer function $I_2(s)/Vi(s)$ of following diagram: (CO3) (7.5)

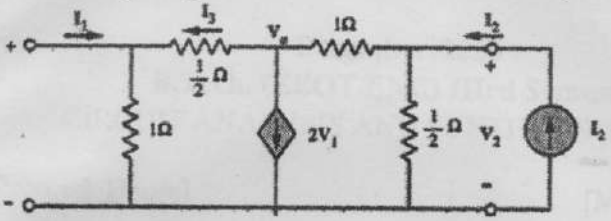


Figure 8.

(b) Design a band stop filter with R0 = 800 ohm, fl= 500 Hz, f2 = 1000 Hz. (CO5) (7.5)

7. (a) Solve for voltages VI and V2. (CO1) (7.5)

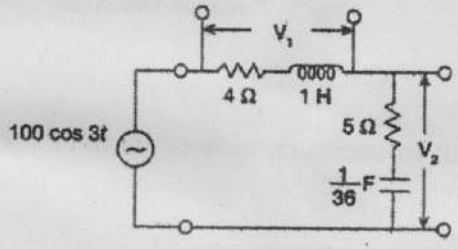


Figure 9.

(b) Verify the superposition theorem for the given circuit: (CO1) (7.5)

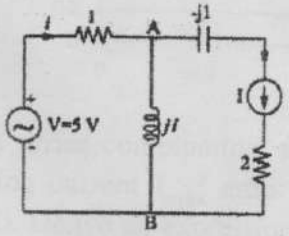


Figure 10.