

Roll No.

Total No. of Pages : 03

Total No. of Questions : 09

B.Tech.(ECE) (Sem.-3)

NETWORK THEORY

Subject Code : BTEC-304-18

M.Code : 76447

Date of Examination : 19-06-2024

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. Write briefly :

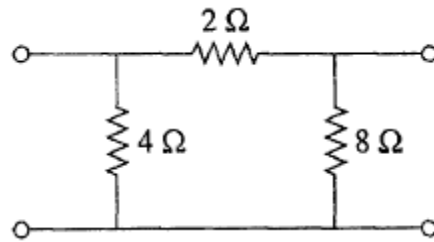
- a. State KVL, KCL and Ohms Laws with mathematical relations?
- b. What is the significance of Dirichlet's conditions in Fourier Series?
- c. Define poles and zeros in a transfer function.
- d. Give expressions for sinusoidal and exponential forms of Fourier Series.
- e. Define image impedance for a 2-port network.
- f. How does frequency effects the impedances of a series RLC circuit?
- g. Relate Laplace Transform and Fourier Transform formulas.
- h. Write characteristic equations for ABCD-parameters.
- i. Under what conditions we can transfer maximum power to the load?
- j. What is current division rule?

SECTION-B

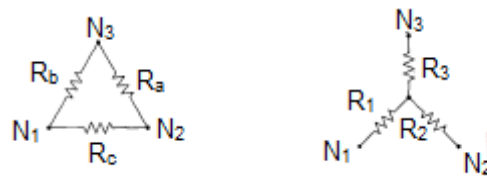
2. Determine, if following system is stable or not.

$$H(s) = \frac{3s^4 + 2s^3 + s^2 + 3s + 4}{4s^5 + 3s^4 + 2s^3 + 2s^2 + s + 1}$$

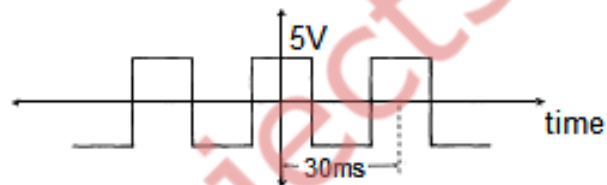
- Compare constant-k filters and m-derived filters.
- Determine Y-parameters for the given 2-port network :



- Determine R_a , R_b , and R_c in following circuit when $R_1 = 6\Omega$, $R_2 = 18\Omega$, and $R_3 = 3\Omega$.



- Find Fourier Series expansion for the following waveform:



SECTION-C

- (a) Synthesize following 1-port network using Cauer-1 Form

$$Z(s) = \frac{s(s^2 + 9)}{10(s^2 + 4)(s^2 + 36)}$$

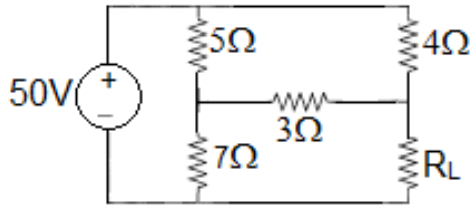
- Synthesize following 1-port network using Foster-2 Form

$$Y(s) = \frac{10(s^2 + 4)(s^2 + 25)}{s(s^2 + 9)}$$

- Derive conversion formulas for 2-port networks:

- h-parameters into ABCD-parameters
- ABCD-parameters into Z-parameters

9. In reference to following circuit :



- (a) Determine load resistance R_L to deliver maximum power transfer.
- (b) Determine maximum power delivered to load resistance R_L .

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.