



**B.Tech II Year I Semester Supplementary Examinations, July 2022**  
**NETWORK ANALYSIS**

(ECE)

Maximum Marks: 70

29-07-22

Duration: 3 hours

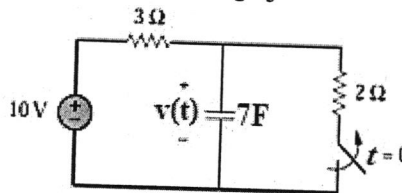
- Note:
1. This question paper contains two parts A and B.
  2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.
  3. Part B consists of 5 Units. Answer any one full question from each unit.
  4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A

All the following questions carry equal marks

(10x2M=20 Marks)

- 1 Two coupled coils with self inductances of 1H and 2H are connected in series aiding. The resulting inductance  $L_{eq}$  is 4H. Find the coefficient of coupling between them.
- 2 What is Ideal transformer and write its properties.
- 3 How do you interpretate time constant in transient analysis
- 4 In the circuit shown in figure , the capacitor voltage just before  $t = 0$  is



Figure

- 5 Find the Laplace transform of  $e^{-at}\sin bt$ .
- 6 State the advantages of Laplace transform application to the solution of electrical circuits.
- 7 The Impedance parameter  $Z_{11}$  in the 2-port network in figure 1 is

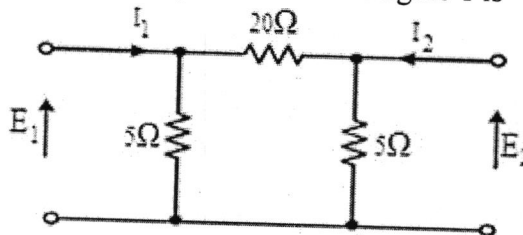


Figure 1

- 8 Why y-parameters are called as short circuit parameters?
- 9 Classify Constant K-Filters.
- 10 Design a Low pass filter (for T-section) having a cutoff frequency of 2 KHz to operate with a terminated load resistance of 500 Ω.

Part-B

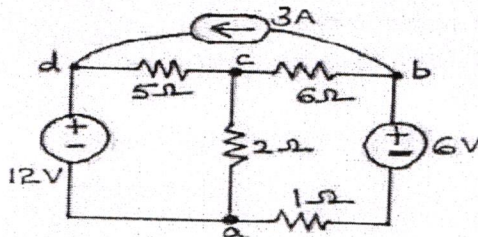
Answer All the following questions.

(5X10M=50Marks)

- 11 a) Derive the equivalent inductance of two inductors  $L_1$  and  $L_2$  connected in parallel opposition connection having mutual inductance  $M$ .  
 b) Two inductively coupled coils have self inductances  $L_1 = 50 \text{ mH}$  and  $L_2 = 200 \text{ mH}$ . If the coefficient of coupling is 0.5 i) find the value of mutual inductance between the coils and ii) what is the maximum possible mutual inductance. [5+5]

OR

- 12 Define tie set matrix, cut set matrix and find the tie set matrix and cut set matrix for the circuit shown in figure. [10]



- 13 For the following figure 2, the switch is closed at position 1 at  $t=0$ . At  $t=0.5 \text{ m Sec}$ , the switch is moved to position 2. Find the expression for the current in both the condition and Sketch the transient current. [10]

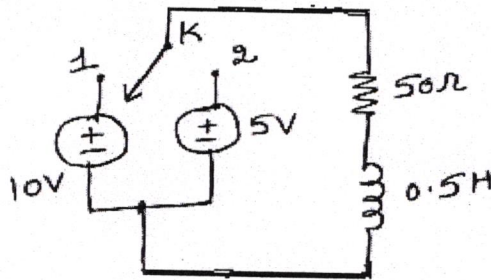


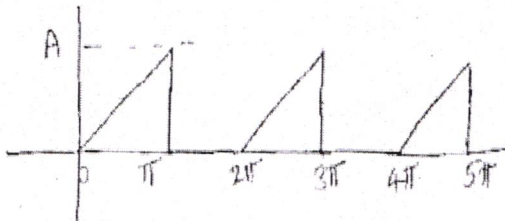
Figure 2

OR

- 14 Explain the transient response in time domain with constant DC excitation as input for a RC circuit. Draw the voltage waveform across R and C. [10]  
 15 Explain the transient response in S-domain with constant DC excitation as input for a RL circuit. Draw the voltage waveform across R and L. [10]

OR

- 16 find the average value, RMS value, peak factor and form factor for the following waveform shown in figures. [10]



- 17 a) Derive the condition for Reciprocity and symmetry in a two port Z - parameter representation.
- b) The Z-parameters of a circuit are given by  $Z_{11} = 4$ ;  $Z_{12} = 1$ ;  $Z_{21} = 3$ ;  $Z_{22} = 3$ . Obtain the transmission parameters. [5+5]

OR

- 18 Determine the Z-parameters for the network shown in figure 4. [10]

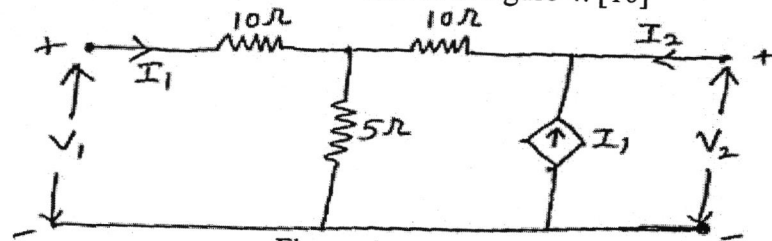


Figure 4

- 19 Explain the design procedure of constant 'K' high pass filter. [10]

OR

- 20 a) Describe the principle of constant K low pass filter and high pass filter.
- b) Design a constant K low pass filter of T-type with a cut off frequency of 2 KHz with a load resistance termination of 500 ohms. [5+5]