**Code No. PC303EC**

**METHODIST COLLEGE OF ENGINEERING & TECHNOLOGY (An Autonomous Institution)**

**B.E. (ECE) III-Semester (AICTE) (Supplementary) Examination, August -2023**

**Subject: NETWORK THEORY**

**Time: 3 hours Max.Marks:60**

**Note: Missing data, if any, maybe suitably assumed.**

**PART-A**

**Answer All the questions.**

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| **Q.No.** | **Questions** | **Marks** | **CO** | **BTL** |
| **1. a** | Define transmission Parameters of a 2-port network. | **2** | **1** | **L1** |
| **b** | Write the condition for symmetry of a 2-port network interms of Z, Y, h and Transmission Parameters. | **2** | **1** | **L1** |
| **c** | Explain a symmetrical network with an example. | **2** | **2** | **L2** |
| **d** | Calculate the characteristic impedance of the following network. | **2** | **2** | **L3** |
| **e** | What is a constant k filters. | **2** | **4** | **L1** |
| **f** | What is a band elimination filter. | **2** | **4** | **L2** |
| **g** | Derive the relation between Neper and Decibel. | **2** | **3** | **L3** |
| **h** | What do you mean by an inverse impedance? Explain with an example. | **2** | **3** | **L2** |
| **i** | What are positive real functions? Explain. | **2** | **5** | **L2** |
| **j** | Distinguish between network analysis and network synthesis. | **2** | **5** | **L2** |

**PTO**

**PART-B**

**Answer Any Five questions**.

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| **Q.No.** |  | **Questions** | **Marks** | **CO** | **BTL** |
| **2.** | **a** | Compute the open circuit impedance Parameters and short circuit Admittance Parameters for the network shown. | **4** | **1** | **L3** |
| **b** | State reciprocity theorem and hence obtain the condition for reciprocity for a 2-port network interms of Z Parameters. | **4** | **1** | **L4** |
| **3.** | **a** | Show that the characteristic impedance of a symmetrical T network is equal to geometrical mean of its open circuit and short circuit impedances. | **4** | **2** | **L3** |
| **b** | Obtain an expression for image impedance Zi1 of asymmetrical L- network. | **4** | **2** | **L3** |
| **4.** | **a** | Explain the different types of filters based on their frequency characteristics. | **4** | **4** | **L2** |
| **b** | Design a constant K low pass filter having cutoff frequency 2000Hz and a nominal characteristic impedance of 600 Ohm. Also find the frequency at which this filter offers an attenuation of 19.1dB. | **4** | **4** | **L3** |
| **5.** | **a** | Design a symmetrical T attenuator to give an attenuation of 40dB and to work into a line of 600 ohm characteristic impedance. | **4** | **3** | **L3** |
| **b** | What are equalizers? Explain a constant resistance equalizer. | **4** | **3** | **L2** |
| **6.** | **a** | Check whether the following polynomial is Hurwitz.  P(S) = 2S4 + 5S3 + 6S2 + 2S + 1 | **4** | **5** | **L4** |
| **b** | Explain how a network function is synthesized using Cauer form-1 | **4** | **5** | **L2** |
| **7.** | **a** | Derive the necessary relations to obtain Y Parameters from Z Parameters. | **4** | **1** | **L3** |
| **b** | Define the following terms. 1) Image impedance 2) Iterative impedance 3) Image transfer constant 4) Iterative transfer constant | **4** | **2** | **L2** |
| **8.** | **a** | What is a composite filter? Draw its block diagram and explain each block. | **4** | **4** | **L3** |
| **b** | Obtain the relations to design a symmetrical bridge T attenuator. | **4** | **3** | **L3** |
| **9.** | **a** | Synthesize the following function using Cauer form- 1 Z(S) = [ S ( S2 + 3 ) ( S2 + 5 ) ] / [ ( S2 + 2 ) ( S2 + 4 )] | **4** | **5** | **L5** |
| **b** | Write a note on impedance matching networks. | **4** | **3** | **L2** |

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